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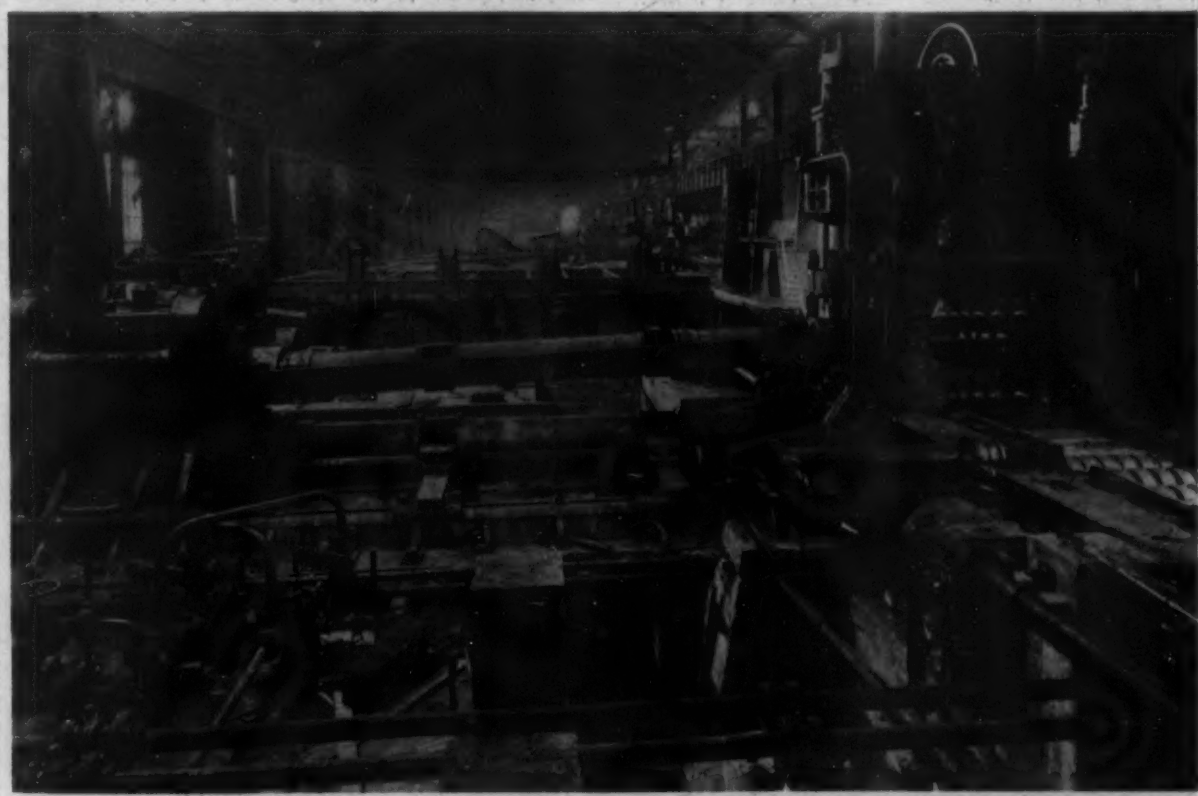
New Mills at Algoma Steel Plant

Repairs and Installation at Sault Ste. Marie,
Giving Nearly 40 Per Cent. Increased Rail
Capacity with Only Two Weeks' Shutdown

BY JOHN A. SOMMERS

On page 707 may be seen the layout of the Bessemer department, blooming and rail mills of the Algoma Steel Corporation at Sault Ste. Marie, Ont. Hot metal is received from the blast furnaces in standard ladles of 20 tons capacity and stored in a 200-ton Wellman mixer (not shown), and from this it is poured into smaller ladles on cars and hauled by an electric locomotive to the two 5-ton Bessemer vessels. Spiegel is melted in a small cupola, the runner of which discharges through the floor into the

is traversed by a Wellman stripping crane and an electric crane charges and draws the ingots from four 4-hole soaking pits having a total capacity of 64 ingots. The 32-in. blooming mill was in reality a 28-in. mill with pinions increased to 32-in. pitch diameter and with rolls of diameter to correspond and the whole driven by a 28 x 48-in. twin reversing engine. After shearing, the blooms are transferred by a hydraulic pusher to electrically driven bloom cars passing along the front of the reheating fur-



The New 35-in. Blooming Mill Viewed from No. 4 Pit Furnace; the New No. 5 Pit Furnace in the Mid-distance

spiegel ladle, which in turn is handled by the same locomotive as the iron ladle car. Before the installation of the mixer the iron for the converters was received from the furnaces as at present, but poured by a ladle-tipping device into the charging ladle and between furnace casts it was received from the iron cupolas shown, in which pig iron was melted.

The steel is taken from the converters by the usual type of center crane serving the molds. The department

nance, where they are charged and drawn by Wellman cranes.

The reheated bloom is conveyed on a roller table from the furnace house to the rail mill, which on the entering side is served by two electrically operated tilting and traveling tables and on the other side by stationary tilting tables. The rail mill comprised a train of three stands of 23-in. rolls with four passes each in the roughing and intermediate sets and three in the finishing. This mill has



Bloom Reheating Furnace No. 1 and Charging Crane; Bloom Buggies and Pusher Pulpits in the Distance

a record of 1103 tons of 86 lb. rails with a daily average of over 900 tons per day.

With a view to increased production the company decided to replace the 32-in. blooming mill by a 35-in. mill and the 28 x 48-in. engine by one having cylinders 50 x 60-in. and to add two 500-hp. boilers to the existing batteries. That the rail mill might keep pace with the blooming mill arrangements were made to divide the train, providing for the roughing and intermediate stands to be driven by the existing 36 and 65 x 48-in. tandem compound Porter-Allen engine and purchasing a new 40 x 48-in. Porter-Allen engine to drive a new finishing stand equipped with 28-in. diameter rolls. Practically all of the above units were on the ground in April, but no details of the connections,

foundations, etc., had been worked out. Increased blooming capacity required further heating equipment and a fifth soaking pit having four holes for eight ingots each was determined upon. There being no space adjacent to the existing furnaces, it became necessary to place the new pits on the far side of the mill, as shown.

Owing to the heavy demand for railroad materials and the construction of the company's own line, the Algoma Central & Hudson Bay Railway, no shutdown of the mills had occurred since 1908. Nor could a suspension of operation over an extended period for the installation of new equipment be considered.

On June 8, under pressure for larger deliveries, the management, with the assurance of its engineers that the



The Bessemer Converter Mill, Showing Pit Furnaces Nos. 1 to 4 and the Operating Pulpit for the New 35-in. Blooming Mill

changes could be effected in two weeks, arranged with its customers for a shutdown between August 10 and August 25. Prior to the shutdown each superintendent and foreman was given a schedule covering his share in the undertaking with time limits set for the completion of each section of the work. The construction department was required through its organization to install the new machinery and to the operating forces was given the problem to overhaul and repair the existing plant. Throughout the campaign both crews worked together harmoniously with intense but friendly rivalry for the honor of being first to blow the whistle to "go ahead."

Foundation work for the 50 x 60-in. engine was begun at once and carried down behind sheet piling through boulders and quicksand to hard pan 25 ft. below yard level. The excavation was entirely by hand with the aid of a locomotive crane for hoisting the loaded buckets and dumping to wagons. On June 25 after working continuously day and night the last concrete was placed and on the following day without building or overhead crane and with only a locomotive crane for handling materials, the first engine bed was set on the foundation and on July 18 the engine, with the exception of oil cups and piping, was ready to turn over.

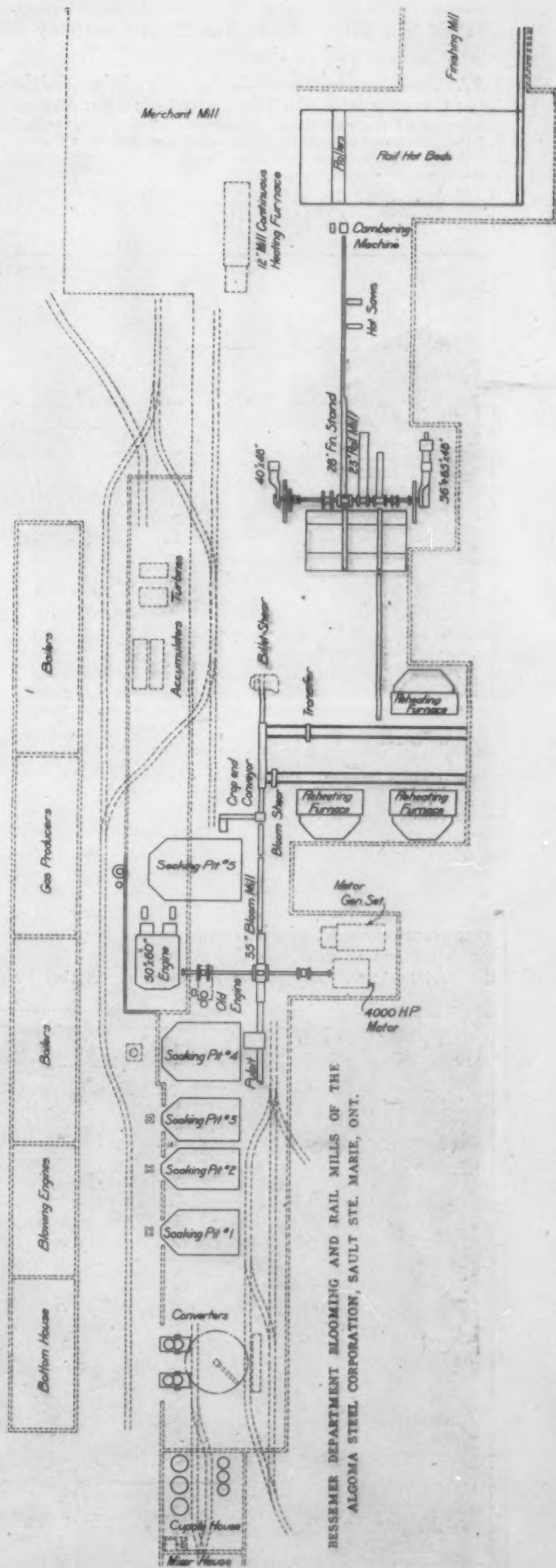
In the meantime steam and exhaust piping, steel framework for the engine house, the No. 5 pit furnace, complete piping for the rail mill engine, pulpits, engine operating mechanisms, etc., were designed and ordered and deliveries of material were such that erection of all was well under way. The rail mill engine had been turned over under steam and the new pinion housings with spindle carriers were installed so that by August 10 the construction department was ready to undertake the mill changes.

Owing to the narrow foundation under the old 32-in. blooming mill it was necessary to provide thick cast-iron sole plates under the shoes. They had also to be wide enough to overreach the sides of the old foundations for the introduction of large anchor bolts in addition to the existing 1 3/4-in. bolts holding down the old shoes. Further, the large mill and the heavier shoes, with the sole plates, required cutting 2 ft. off the top of the old concrete and the addition of new concrete on each side to secure the requisite mass. At 10 o'clock p. m. on the date fixed the last bloom was rolled and by the next morning the old mill and engine were taken up and loaded on cars, steam and air drills with the aid of dynamite removed the top surface of concrete and on August 13 sole plates and shoes were ready to be lined and leveled. The erection of the remainder of the mill presented no difficulties except alterations to main tables due to the wider mill housings. The installation of the new rail finishing stand with new lifting gear for the tables requires no comment.

While the construction forces were engaged on the mills and engine the operating department relined all the cupolas, laid new ladle car rail and cast-iron floor plates to and around the vessels, put new noses, trunnions and bearings on the converters, practically rebuilt the center crane and stripper, rebuilt the four pit furnaces, replaced all damaged binding on them, rebushed or rebabbitted all table bearings from the ingot pot to the end of the shear run-out, constructed concrete collector bar conduits and relaid tracks for the bloom buggies in the reheating furnace house. It thoroughly overhauled all of the rail mill tables and the 36 and 65 x 48-in. engine. Sundry other repairs were made throughout on the hot beds and finishing mill machinery.

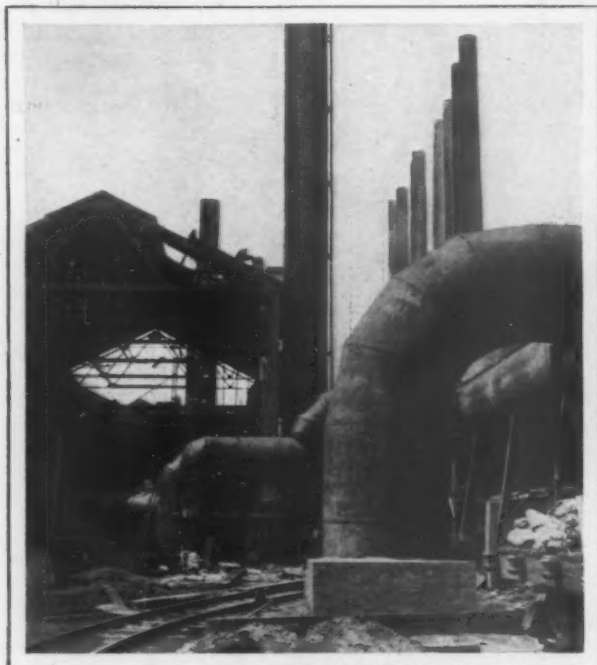
On August 25 the first ingot was rolled and after the first day's run on the rail mill the production was at the rate of 1200 tons per day and at this writing, August 29, the mill is rolling at the rate of 1268 tons.

The Cleveland Tool & Supply Company, now located at 1515-19 Columbus Road, N. W., Cleveland, Ohio, has leased for a long term the four story and basement block now occupied by Kinney & Levan, 1427-37 West Sixth street. It will secure possession of the property April 1, 1913, and will move to the new site as soon as it can remodel the building. Its new quarters will furnish the company a largely increased amount of floor room.



President Price of Cambria Steel Company Resigns

At a meeting of the board of directors of the Cambria Steel Company at Philadelphia September 19 Mr. Morris, chairman of the executive committee, called the attention of the board to the serious illness of the president, Charles



View Toward the 50 x 60-in. Engine House, Algoma Steel Corporation. The stack and gas piping for new No. 5 pit furnace, and in the near foreground gas main elbowing into underground flue to bloom reheating furnaces. This pipe was cut off and moved back 40 ft. to the position shown to permit extension eastward of engine house. The view is calculated to indicate the congested space in which construction was carried on.

S. Price, which had existed for some time, necessitating an indefinite leave of absence to him, with consequent closer supervision of the works at Johnstown by the executive committee. This had been possible, he explained, only by the courtesy of William H. Donner as a member of the committee and by reason of his practical knowledge of the steel business. Mr. Morris expressed regret that he

was obliged to present to the board the resignation of Mr. Price as president of the company, which had been sent to him for the purpose under date of September 17, 1912. He asked that no action be taken thereon at the meeting, but that it be referred to the executive committee with power to recommend to the board for approval at a subsequent meeting such changes in the organization of the company as may be required. Mr. Morris said also that his own personal desire under these circumstances was to be relieved as chairman of the executive committee of responsibility for such portion of the work of the committee as pertained to practical supervision of the works at Johnstown, and expressed the hope that Mr. Donner assume either a chairmanship of the board of directors with proper executive authority, or that the details of the business be divided by the board between an executive committee and a finance committee of the board, with appropriate powers to each under a revision of the by-laws, and that Mr. Donner assume in that case the chairmanship of a new executive committee. Thereupon the resignation of Mr. Price was laid upon the table for future action, the sincere regret of the board being expressed for the reasons which has caused him to tender it, as well as the earnest hope of the directors that his health may be restored. The questions of reorganization of the executive staff of the company and of a possible revision of the by-laws relative to committees of the board were referred to the executive committee to report at a future meeting.

The Republic Iron & Steel Company announces to its stockholders that in view of the action of the board of directors in May, 1912, changing the ending of the company's fiscal year from June 30 to December 30, the annual meeting of the stockholders, which has been held on the third Wednesday in October, will hereafter come on the third Wednesday in April. The change in the fiscal year is in order that the annual reports of the company may correspond with the period of reports required by the Federal Government, including corporation tax reports, as well as reports required by State authorities. The company's fiscal year will now correspond also with that of other large steel companies.

For the convenience of their customers in the Middle West, J. H. Williams & Co., makers of Diamond W drop forgings, Brooklyn, N. Y., have opened an office and warehouse at 40 South Clinton street, Chicago, where a full stock of their drop-forged specialties will be carried.



The 23-in. and 28-in. Rail Mill, Algoma Steel Corporation, with Tables on One Side Showing the New Stand and in the Building to the Left the 40 x 48-in. Engine

An Open-Hearth Furnace Operating With Mechanical Draft

On September 10 a locomotive crane operator of the Ohio Steel Foundry Company, Lima, Ohio, ran the boom of his crane into the guy wire attached to the open-hearth



Another View of the Blower Showing Arrangement of Drive

furnace stack, pulling the stack down. This stack was 60 in. in inside diameter and 115 ft. high and was lined to the top with a $4\frac{1}{2}$ -in. ring of fire brick. The accident happened about 4 o'clock in the afternoon. The company purchased an 80-in. exhaustor from the American Blower Company at Detroit, had it shipped by express, and the furnace was in operation again Thursday morning, September 12, at 8 o'clock. It is still operating with the exhaustor in lieu of the stack until such time as the company can erect a new one. Then it intends to put up a self-supporting stack of steel, concrete or brick.

This is probably the first time that an open-hearth furnace has been operated by means of mechanical draft. The accompanying illustrations show the exhaustor in place. A brick flue about 10 ft. high, arched over at the top, was built on top of the stack foundation, and an opening left in it for the pipe which leads to the exhaustor. When the exhaustor was first put in operation it was operated at a speed of 750 r.p.m., but this gave too much draft. In fact, the damper had to be kept almost closed. The speed has since been reduced to about 500 r.p.m. With that speed the damper is kept at about the same height as it was when the stack was furnishing the draft.

A. G. Hobson, Lord Mayor of Sheffield, England, in a paper on the cost of the British workmen's compensation act and the old age pensions and national insurance acts, points out that producers are faced with an increased cost of 1.77 per cent. on their wages bill. "Nearly all the materials they buy will," he says, "be affected by similar considerations, and I do not hesitate to say that the price of materials will be generally lifted at least $2\frac{1}{2}$ per cent. The prudent firms, who look carefully into the cost of the articles they manufacture, will be bound to raise their selling price by $2\frac{1}{2}$ per cent."

The Vulcan Crucible Steel Company, Aliquippa, Pa., discontinued carrying a stock of tool steel in Detroit August 1, and James C. Eckliff has been appointed Detroit sales manager with offices at 327-328 Ford Building.

Vulcan Iron Works Making Sugar Mills

The Vulcan Iron Works, Wilkes-Barre, Pa., recently shipped to the Senado Sugar Company, Senado, Cuba, a heavy sugar mill, designed by J. V. Hamilton, the equipment consisting of a 34 x 72-in. nine-roll mill, driven by a 32 x 60-in. simple Corliss engine; a single three-roll mill, driven by a 22 x 48-in. simple Corliss engine, and a 30 x 72-in. cane crusher, driven by an 18 x 30-in. slide valve engine. The rolls for the cane mill are of cast iron, 34 in. in diameter and 72 in. long, weighing 7 tons each. The crushing rolls are inclosed in steel housings and have water cooled bronze bearings. Adjustments to the rolls are by heavy screws, while those used as bagasse rolls operate under a pressure of 350 tons, maintained by a weighted accumulator. As the speed of the rolls is not over 25 ft. per min., the driving gears and shafts of the mill machinery are made exceptionally heavy, the main gears being 12 ft. in diameter and 14 in. face, of cast steel with machine cut teeth. The grinding capacity of this mill will be 600 tons per day. The Vulcan Iron Works is an extensive manufacturer of mining machinery, locomotives, engines, etc., and has now entered the field of sugar mill machinery.

The Canton Foundry & Machine Company, Canton, Ohio, has taken orders for a full line of machinery for the manufacture of metal ceilings, side walls, roofing, etc.,



An 80-In. American Exhaustor Driven by a 25-Hp. Motor Furnishing Draft for a 20-Ton Open-Hearth Furnace at the Plant of the Ohio Steel Foundry Company, Lima, Ohio

for W. P. Hopson & Co., Grand Rapids, Mich., and a complete equipment for making ceilings for the Insular Supply Company, Manila, P. I. It has recently shipped orders for ceiling machinery to the Metallic Roofing Company, Toronto, Ont., and to the McFarlane-Douglas Company, Ottawa, Ont.; six drop presses to the Fisher Body Company, Detroit, and three drop presses to the Wilson Body Company, Detroit. It has also supplied considerable machinery for the new plant of the Canton Metal Ceiling Company. Its business in the past four months has been double that of the corresponding period a year ago.

J. P. Morgan & Co. have purchased \$10,000,000 5 per cent. debenture bonds of the General Electric Company. These bonds are part of an authorized issue of \$60,000,000 created last July at the time of the 30 per cent. stock dividend. It is stated that the proceeds are to be used in strengthening the company's working capital. Its business is expanding very rapidly, gross for this year being at the rate of about \$93,000,000 per annum, against \$70,000,000 in 1911.

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A New Method of Casting Small Ingots

The Molds Are Made by the Use of Grooved Plates Which Are Pressed Together—An Economical Method of Breaking Runners

The *Revue de Metallurgie* has an interesting article by M. J. Corbiau describing a new method of casting small ingots devised by M. Defays-Lanser, an engineer of Brussels. It is particularly applicable to small rolling mills and plants which are now dependent on outside sources of supply for their billets, as it offers a promising method for casting large numbers of small ingots successfully, in good condition to be rolled directly in small mills. There has always been great difficulty in casting small ingots. For instance, a 165 to 175 lb. ingot and a 15-ton open-hearth furnace would mean about 192 ingots. These may be arranged in 48 groups of four, or 32 groups of six, using bottom pouring. After pouring, the groups are united by the steel from the runner spout and the breaking of this steel requires long and laborious supplementary hand labor. Further, when the molds have been used for some time the steel sticks, and the stripping is made long and difficult. For these reasons the pouring floor is not cleaned up for a long time, and if the next heat should come a little ahead of time the molds are not set up ready for pouring, which of course retards the operation.

Making of Molds and Breaking of Runners

In order to guard against these inconveniences M. Defays-Lanser has worked out a method that, in addition to other advantages to be examined later, allows all the runners of steel uniting the ingots to be sheared at one operation, and so makes possible rapid and easy stripping. In this process the molds are formed by plates with properly

steel to set in the bottom runner bricks, the piston *g* is brought back by means of the little cylinder *k*, and pressure is admitted to *f*. Under this pressure everything is moved bodily; the runners of steel from the pouring funnel to the separate ingots are all cut close to the base of the ingots, so that the latter are now entirely separate from each other. Afterward the pressure is released and the ingots are easily stripped from the plate ingot molds.

Economies in Detail

This process has several important advantages. First of all is the rapidity with which the steel can be stripped and the molds properly set up again. In this way the operation of the furnace is not slowed down, and the ingots can be delivered hot to the mills, which reduces the cost of reheating. Further, steel ingot mold plates can be used, which stand up much better than cast iron, and the plates can be easily examined and kept in good repair.

The method is then compared in detail with that of bottom pouring ordinary small ingots weighing about 175 lb., 4.72 x 4.72 x 31.5 in., in groups of four, the steel being taken from a 15 to 16-ton open hearth furnace. It will need 48 groups of 4 ingots per heat, corresponding to about 15 tons of steel. In a year of 250 working days this will amount to about 15,000 tons. First, the saving in brick is considerable, for in the new process the ingots are poured very near together. Under Belgian conditions this is calculated to amount to 6240 francs per year. The consumption of molds will be less with the new system, although it

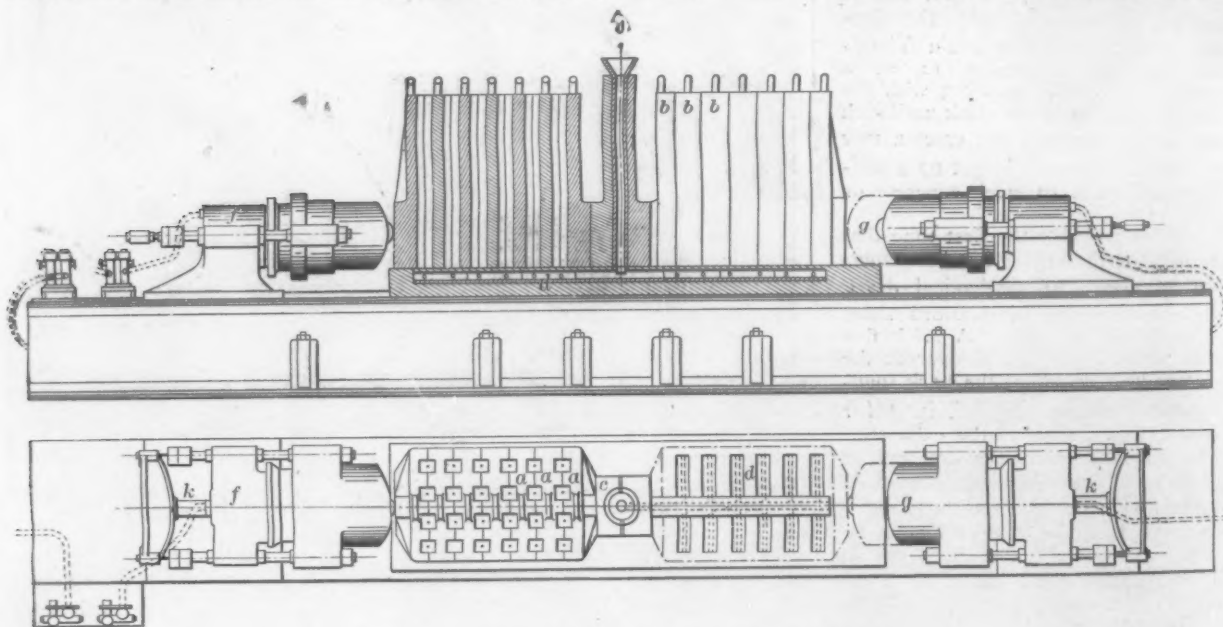


Fig. 1—Defays-Lanser Method of Casting Small Steel Ingots

shaped vertical grooves. The plates are placed touching each other, and the grooves form cells in which the steel is poured. The pressure necessary to hold the plates tightly against each other may be supplied by hydraulic cylinders, steam or compressed air.

Fig. 1 shows one method of applying this invention. At *a, a, a* and *b, b, b*, are two series of plates which are pressed together to form the molds; *c* is the central pouring funnel, *d* the bottom bricks, and *f* and *g* two identical hydraulic cylinders working in opposition, which serve to keep the plates tight against each other. The two small hydraulic cylinders *k, k*, serve to bring the pistons of the cylinders *f* and *g* back to position. The operation is simple. Before casting, the piston *g* alone is exerting pressure, and is in the position shown by dotted lines. When the casting is over and a short time has elapsed to enable the

must be remembered that they will cost considerably more at the start, because of the greater care necessary in making them, so that the joints may fit closely. Paying due attention to this, and figuring that the scrap value of both kinds of molds is the same, the annual saving in favor of the new molds is given as 2700 francs.

The bottom pour waste will be considerably less with the new system. In this particular case the gain will be 690 lb. per heat, or 690 tons of ingots per year. Under Belgian conditions this represents an annual saving of 12,480 francs over the scrap value of the bottom pour scrap. The labor necessary will be reduced, two men per shift being saved, which means 5000 francs per year. The next point is the use of the ingots in the rolling mill. Ordinary ingots are usually tapered to assist in stripping, but with the new system they can be of the same section throughout, just

like billets. This is very important, as the head of the ingot should be worked more than the rest, but at present it is the part worked the least during the first passes when the temperature is the best to allow welding. With the new system it would be easy to make the head larger than

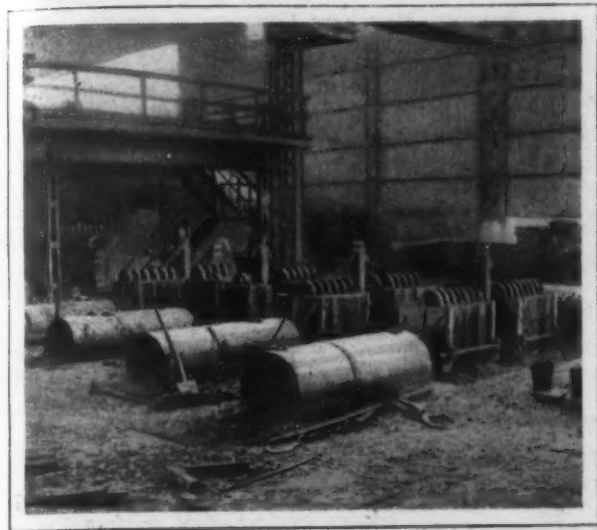


Fig. 2—Apparatus for Casting Small Ingots in a Belgian Mill

the base of the ingot, or to cast round ingots suitable for making seamless tubes, or flat ingots for slabs and plates.

A small Belgian rolling mill using this system, as shown in Fig. 2, has found that 109 tons of ingots are necessary to give 100 tons of finished steel. The results of previous practice were 112 tons of ingots cast in the ordinary way, or 106 tons of billets. Taking these figures as a basis the use of 15,000 tons of ingots cast by the new method would give 370 tons more finished material than old style ingots per year. In the latter case this 370 tons would be scrap. The gain would be 25,900 francs. The total of these sums shows 3.48 francs per ton in favor of the new system, equal to about 70 cents per ton.

Certain plants use molds with four or six compartments in order to facilitate setting up the molds, stripping, and keeping the casting floor clean. Such molds are certainly better than ordinary ones, but the new system is still more advantageous. Calculations are given in the original paper to prove this. No account has been taken of the cost of the power necessary to operate the new method. It must be small and under no circumstances can be more than 2c. per ton.

The main objection to be raised is the difficulty of maintaining a close fit between the plates, as cast iron will burn after being in contact with liquid steel a certain time. The use of cast steel plates should be carefully considered, as these will stand up much better than cast iron. In this connection it may be mentioned that recent tests have shown that ordinary molds of cast steel are very satisfactory.

In conclusion, the Defays-Lanser process offers important advantages in regard to ease and rapidity of operation. It also considerably lowers the conversion cost from the furnace to the finished product. In comparison with the ordinary methods of bottom pouring small ingots, it gives a saving that quickly pays off the cost of the original installation. It is also pointed out that it does not take up much room and so allows the cost of buildings, etc., to be reduced.

G. B. W.

Dr. Karl Georg Frank, 90 West street, New York, representing Siemens & Halske and Siemens-Schuckertwerke, Berlin, states as a matter of interest to the readers of *The Iron Age* that the armor plates of the new French battleship Paris, scheduled to be launched the end of this month, are made of a new chrome-nickel steel. Dr. Frank says: "These plates have successfully withstood the firing tests, and there is great satisfaction felt with this improved protection against gun fire. This new alloy steel was made at the Acieries de la Marine et d'Homecourt, St. Chamend France, in a polyphase Roehling-Rodenhauser furnace."

Texas Iron Interests

AUSTIN, TEXAS, September 23, 1912.—If negotiations that are now pending for the sale of the blast furnace and cast-iron pipe works which were established many years ago as an adjunct of the penitentiary system of Texas are consummated, this State will completely abandon the iron industry. The State's plant is situated at Rusk, and during the different periods that it was in operation all of the labor was performed by prison convicts. Governor O. B. Colquitt and the Prison Commission have authority to dispose of the property if an advantageous offer for it is received.

Incident to the general development of the iron ore resources of eastern Texas a new syndicate has entered that field. It is represented by E. E. Vaughn and J. J. Skinner of Philadelphia, who have made a proposition for the purchase of the plant at Rusk. During a recent visit to Austin, when they laid the matter before the Governor, they made the statement that they and their associates have acquired iron ore lands in Cass and Marion counties which are estimated to contain at least 50,000,000 tons of ore of good grade. They have secured options on more than 10,000 acres additional and the deal for its purchase will soon be closed. Besides the plan to take over the furnace at Rusk and enlarge the plant, Mr. Vaughn and associates propose to establish a large iron and steel plant at some other point in eastern Texas, probably at Texarkana. If they do not succeed in purchasing the furnace at Rusk they will seek to lease the plant. They also contemplate purchasing from the State a large tract of iron ore land situated adjacent to Rusk.

The State's iron plant has had many ups and downs during the quarter of a century and more that efforts have been made to operate it. It is claimed that the different failures to make the industry a success have been largely due to politics. John L. Wortham, who is now a member of the State Railroad Commission, conducted the industry for four years during the administration of Governor S. W. T. Lanham. Mr. Wortham at that time was financial agent of the penitentiary system. Through his efforts an appropriation of \$150,000 was obtained from the Legislature to rebuild the furnace and to make other improvements to the property. He soon placed the industry on a very profitable basis, and when Governor Lanham's term expired it was claimed by Mr. Wortham and others that a very satisfactory profit was being made out of the iron industry. He returned to the State the \$150,000 that had been appropriated, as this sum and a considerable additional amount had been realized as profit from the furnace and its allied plants during the period they were conducted under his direction.

For the last seven years the plant has been inactive and is said to have fallen into a bad state of repair. One of the chief factors to be reckoned with in operating the furnace was the high cost of coke. Mr. Wortham claims, however, that he overcame that obstacle to a great degree, and that it is not necessarily a hindrance to the successful operation of the plant.

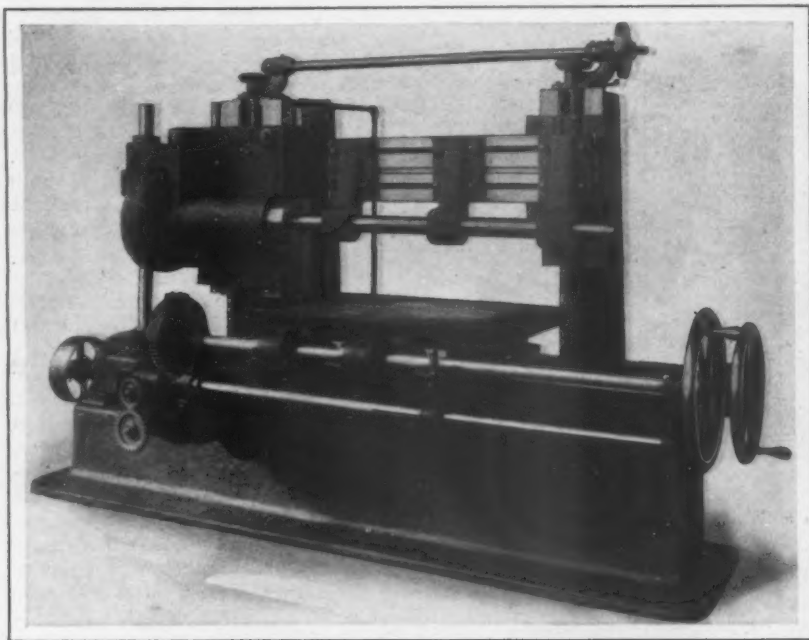
The recent construction of the Port Bolivar Iron Ore Railroad from Longview to Ore City, in Cass County, has supplied the iron ore fields of that section with a transportation outlet. This road was constructed as a direct result of the iron mining operations that are now being conducted on an extensive scale in that county by Charles M. Schwab. It has, however, served as an incentive for other persons who are interested in the iron and steel business to enter the new field and acquire extensive bodies of iron ore land. It is reported that Mr. Vaughn and associates will construct a railroad into their iron ore fields from the north with Texarkana as the probable terminal in that direction. This road will connect with the Port Bolivar and Ore City line.

A petition for a receiver for the Globe Machine & Foundry Company, Philadelphia, Pa., was made to the local courts last week, dissensions among the directors and stockholders being given as the reason. C. H. Hett has been named as receiver and will operate the plant.

James B. Clow & Sons will enlarge their plant at Coshocton, Ohio, in order to add to their line the manufacture of 4-in. cast iron pipe. The new building will be 100 x 300 ft.

Crank Case Milling Machine

For milling the ends of crankshaft bearings on crank cases the Beaman & Smith Company, Providence, R. I., has recently developed a special type of machine. As will be noticed from the accompanying engraving the machine consists of a work table supported on a bed, which, in addition to supporting the work table, also serves as a means



A New Type of Machine for Milling the Ends of Crankshaft Bearings on Crank Cases
Built by the Beaman & Smith Company, Providence, R. I.

of attachment for two uprights that in turn carry the spindle saddle and cross rail. In general the construction is the same as the various other machines built by this company.

The table, which has a working surface of 18 x 32 in.; is surrounded by a trough. There are four T slots finished from the solid and there is a movement by hand of 32 in. in line with the spindle and a cross travel of 11½ in. The feeds for the latter movement of the table are positive and there are five changes provided by gears which range from 1½ to 6½ in. per minute.

The cross rail is raised or lowered by hand and is attached to the spindle saddle. The dial graduated in thousandths of an inch is furnished to facilitate setting cutters to the desired depth. The spindle, which is of crucible steel, has a key for driving the arbor at its end. It runs in hard bronze boxes having means to compensate for wear. The dimensions of the spindle bearings are 4⅞ in. in diameter and 6 in. long for the front one and 4¾ in. in diameter and 5½ in. long for the rear one. The cutter arbor has collars and a cutter section 1⅞ in. in diameter and 42½ in. long. Three arbor supports with phosphor bronze bearings 2½ in. in diameter and 5¾ in. long are provided.

The machine is driven from a countershaft which has a tight and a loose pulley 12 in. in diameter and runs at a speed of 300 r.p.m. From this countershaft the power is transmitted by a 4-in. belt through gearing in the ratio of 2.7 to 1 to give a spindle speed of 150 r.p.m.

The following table gives the principal dimensions and specifications of the machine:

Distance between uprights, in.....	44
Minimum distance between spindle center and top of table, in..	10¼
Maximum distance between spindle center and top of table, in..	15¾
Minimum distance between face of spindle and edge of table, in....	3
Maximum distance between face of spindle and edge of table, in..	35
Minimum distance between spindle center and edge of table, in..	7½
Maximum distance between spindle center and edge of table, in..	19
Weight, lb.	10,300

The equipment furnished with the machine includes a pump for supplying cooling compound to the tools, together with the necessary tank, piping, etc.

August exports of merchandise were \$167,885.095 and imports \$155,020,792; excess of exports, \$12,864,303.

Improved Heavy Presses

A Continuation of the Standard Machinery Company's Regular Line

A new type of press which is known as the No. 6B back geared press has been recently placed on the market by the Standard Machinery Company, 7 Beverly street,

Providence, R. I. Among the special features of the machine are the construction of the upper and lower connection, together with the adjustment and clamping device, the use of a clutch that grips instantaneously when the treadle or handle is pressed and which can also be stopped at more than one point in a revolution. Views of both sides of the press are shown in the accompanying engravings, Fig. 1 being a general view, while Fig. 2 shows the driving side.

This press has a net weight of 15,500 lb. and is heavily back geared with cut steel gearing. The equipment includes the builder's instantaneous roller friction clutch which permits the machine to be run continuously or to be stopped at each revolution either by hand or foot. The special features of the clutch are that it grips the instant the treadle or the handle is pressed, it being emphasized that after engagement there is less than 1/32 in. travel on the periphery of the balance wheel. The clutch possesses the additional feature that it is so constructed as to be stopped at more than one point in a revolution. This feature, it is emphasized, makes the machine especially adaptable for heavy forming, embossing or similar operations where it is essential for the dies to dwell after striking. As will be noticed from both engravings the machine is very heavy and rigid in design. It is fitted with stay rods and is of the open side and open back type. The frame is so constructed that

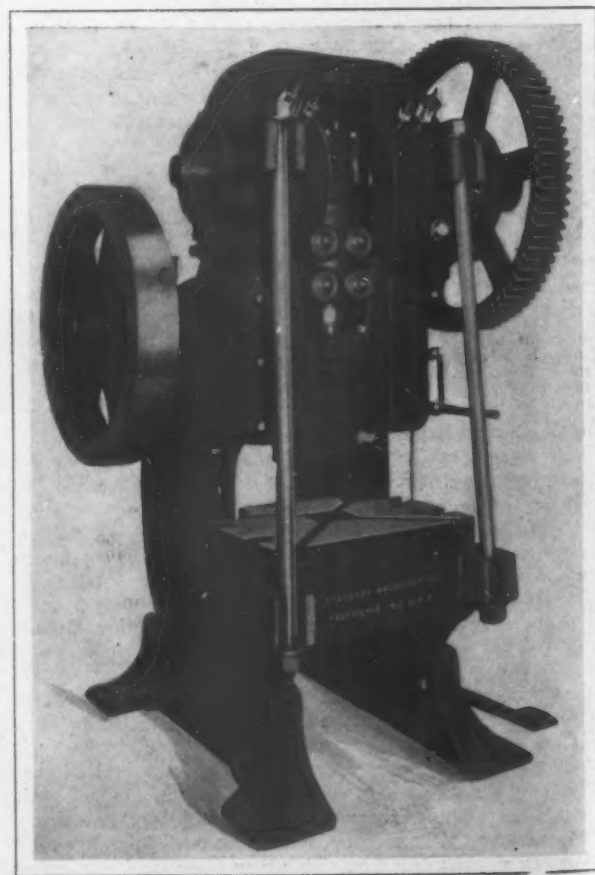


Fig. 1—One of the New Heavy Presses Built by the Standard Machinery Company, Providence, R. I.

the path of the ram is directly in line with the main crankshaft bearings and the wrist pin on the dead center in either direction is also in a plane that passes through the center of the ways as well as the center of the ram. Special stress is laid on the fact that this feature insures the rigidity found in the press.

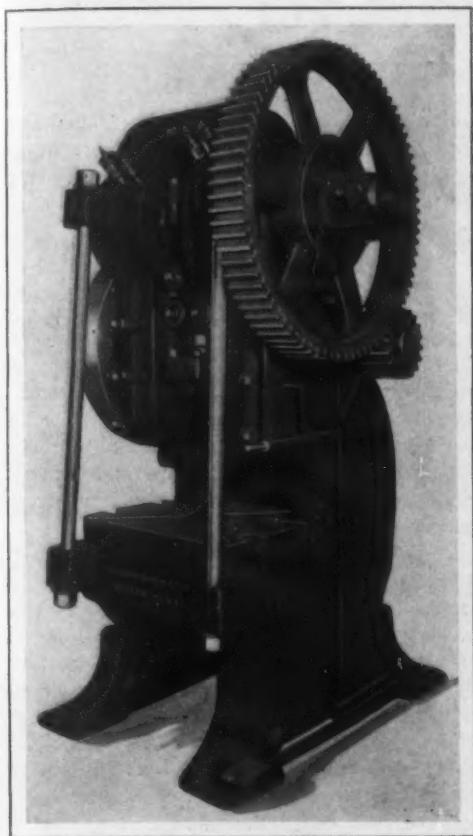


Fig. 2—View of the Press Showing the Driving Side

The bolster plate is fitted with T-slots to permit various sizes of die holders and dies to be used, and there is a hole in the bed which is finished according to the purchaser's specifications. The journals where the back gear shaft runs are lined with bronze and have a large oil groove. Cut steel is used for the pinion and the driving or clutch gear is of gun iron.

The following table gives the principal dimensions and specifications of the press.

Stroke of press, in.....	3
Diameter of crank pin, in.....	5
Diameter of crank pin fins, in.....	8 3/4
Diameter of lower connection ball, in.....	6 1/4
Diameter of lower connection screw, in.....	4 1/4
Size of bottom of slide, in.....	13 1/4 x 7 1/2
Adjustment of slide, in.....	6 1/4
Distance between slide and bolster plate, in.....	7
Thickness of bolster plate, in.....	3 1/4
Size of hole in bolster plate, in.....	6 x 6
Distance from center of slide to back of press, in.....	8
Dimensions of hole in bed, in.....	10 x 10
Distance between uprights, in.....	16
Depth of bed, in.....	18
Width of bed, in.....	30 1/2
Face width of driving gear, in.....	5 1/2
Gear ratio.....	1 to 4 1/2
Diameter of flywheel, in.....	36
Face width of flywheel, in.....	5 1/4
Weight of flywheel, lb.....	900
Weight of press, lb.....	13,500
Over-all height, in.....	102
Floor space required, in.....	72 x 72

The construction of the upper and lower connection as well as the adjusting and clamping device is another novel feature of the press. The lower connection is a forged steel ball fitting into a hemispherical center in the ram. A bronze retainer, which is also hemispherical on the lower part, is fitted on the upper part of the ball and the upper part of the lower connection is threaded and engages with the threaded portion of the lower part of the upper connection, the clamping being done by four screws in the upper connection. Each of these screws has a bronze bushing around it, which is threaded simultaneously with the hole in the upper connection. The connection is split through the center and the lower portion of each one of the clamping screws goes through to the opposite side, and

in clamping the two connections, after the ram is adjusted to the proper height, the screws are tightened and the bronze bushings which in turn are fitted to the threads of the lower connection are forced against the shank in the lower connection. It is emphasized that this arrangement never slips and having the bronze bushing outside of the clamping screws prevents the lower connection from being bruised. The upper connection is bronze bushed around the wristpin, which is 5 in. in diameter. Take-up boxes on either side of the main bearings enable adjustment to be made for wear and the construction of the press is such that a roll or dial feed can be attached on the left side of the crankshaft.

When so specified the machines are fitted with a tight and loose pulley drive in addition to the balance wheel. Double back geared and plain presses are also built, and, if desired, motor drive can be supplied.

Rapid Blast Furnace Reconstruction

The Ashland, Wis., charcoal blast furnace of the Lake Superior Iron & Chemical Company, J. E. Johnson, Jr., manager, was blown in September 18 after being out for 11 weeks for rebuilding and re-equipping. The work began with scaffolding up the top of the furnace, tearing out the brick work and cutting away everything below the top 16 ft. of the shell, which was in satisfactory condition. New foundations were put in, and new columns and new shell complete below the top portion mentioned. The furnace was supplied with new bosh jacket, tuyere jacket and hearth jacket, new penstocks, new top rigging complete, with automatic gas seal, and was relined. New and larger hoist cages of steel were installed and the filling-space at the foot of the tower rearranged. The domes of two stoves were found rusted out and new tops were put on, the stoves being also changed from four-pass to two-pass. The work involved in addition extensive repairs to one of the blowing engines, the partial rebuilding of nearly half the charcoal kilns and practically the rebuilding of trestles supplying them, and repairs and improvements were made at the chemical plant.

The steel work of the furnace was done under contract by the Duluth Boiler Works and the lining and one small job were let on contract, the remainder of the work being done by the company's own force according to its own plans. A radically new construction was adopted for the blast furnace proper, and this contributed to the rapidity with which the work was done.

The Empire State Implement Men's Club

The semi-annual meeting of the Empire State Implement Men's Club was held at Hotel Winchester, Syracuse, on the evening of September 12. Much enthusiasm was shown regarding the convention to be held at Lockport, February 21 and 22. President C. E. Pierce of Geneva presided, and the secretary-treasurer, E. H. Babbage of Lockport, acted in his official capacity. To make further preparations for the twelfth annual meeting the following committees were appointed: Banquet—E. H. Babbage, Lockport; H. W. Rawden, Fredonia; F. R. Chase, Rochester; R. A. Pearson, Lockport. Reception—E. E. Dickinson, Lockport; John Moon, Lockport; Philip Papke, Tonawanda; F. E. Crittenden, Rochester. Entertainment—E. S. Brown, Lockport; Chas. Mather, Canandaigua; H. M. Bly, Rochester; Frank Rinn, Gasport. Programme—W. H. Barry, Lockport; R. E. French, Attica; Louis Wiard, Batavia; Grant Gillam, Lockport. The report of the treasurer showed the club to be in a very flourishing condition.

The Juniata Furnace & Foundry Company is preparing to blow in its Marshall furnace at Newport, Pa. Its mines are being prepared for operation, and it is expected that the stack will be ready late in October.

The No. 3 stack of the E. & G. Brooke Iron Company, Birdsboro, Pa., will be ready for blowing in about October 1. New engines have been installed to replace those recently destroyed by fire.

The Ohio Engine Sales Company, Sandusky, Ohio, has been incorporated with a capital stock of \$10,000 to deal in machinery and supplies. The incorporators are J. F. Donahue, C. F. Donahue, George H. Schiver and others.

Ways of Losing and Saving Castings

What the Foundry Superintendent Needs to Observe in Handling Molten Metal—Second Article on Shop and Foundry Management

BY STUART DEAN

There are 37 different ways of losing a casting.

- 1—Cold iron.
- 2—Dirt in the molten iron.
- 3—Poorly skimmed iron.
- 4—Iron too hard.
- 5—Gas in the iron.
- 6—Mold too wet.
- 7—Cores not perfectly dry.
- 8—Mold rammed too hard all over or too hard in a spot.
- 9—Core rammed too hard.
- 10—Mold rammed too soft.
- 11—Mold not properly vented.
- 12—Cores not properly vented.
- 13—Tearing up of the mold in drawing the pattern and not patching the sand back properly.
- 14—Runout from a bad fit of the cores in the prints.
- 15—Runout from iron passing through a vent in the cores.
- 16—Runout from a strain through the solid sand of a mold.
- 17—Runout from poorly made parting.
- 18—Crush from a poorly made parting.
- 19—Crush from crooked setting of the cores.
- 20—Crush from poor fit of cores in prints.
- 21—Shift caused by flask pins being loose.
- 22—Drop-out because too few bars or sand hooks were used.
- 23—Drop-out because flask was weak or loose at the corners or at the bars.
- 24—Drop-out because sand was too weak.
- 25—Drop-out from something striking the top of the jagger after the mold was closed.
- 26—Dirt in the pouring basin, gate or mold or loose dirt around the tops of the risers.
- 27—Cores not wired or rodded strongly enough.
- 28—The raising of a core from not anchoring it properly.
- 29—From the casting's cracking because it was gated wrong or from wrong iron mixture or bad design.
- 30—From internal shrink caused by improper molding or by wrong iron mixture or by cold iron or by bad design.
- 31—Failure to run or cold shut from bad iron mixture, too cold iron, too hard ramming, too thin a design or bad gating.
- 32—Scabbing of mold.
- 33—Cutting of mold.
- 34—Scabbing of core.
- 35—Restricted passage of gas after it leaves the core.
- 36—Dirt from the washing of core blacking.
- 37—Dirt from the washing of mold blacking.

An experienced foundryman can tell why a casting was lost by examining the bad spots. The flaw in the casting speaks out to him plainly.

Gas Bubbles in Castings

Gas bubbles in castings come from three sources. They come from the mold or cores; from the iron having been poured too cold; or from a gas that is in the molten metal itself.

The first trouble can be avoided by care in making the mold and cores; the second by following exactly the rules for running the cupola and by handling the iron rapidly after it is in the ladle. A remedy that will completely eliminate the gas that is in the molten iron has not yet been discovered. This gas is not always present. It will appear in some heats and in others will not be in the least apparent. This gas always shows up in the shape of small,

deep, penetrating, worm-like holes right around the place where the pouring gate enters the casting; never anywhere else. It will only show on the first castings poured with each ladle of iron. The gas seems to pass out of the iron after it stands in the ladle.

This gas can be partly eliminated by running the iron through long gate grooves around the parting before it enters the casting. Most of the worm-like holes will then come in this long gate.

Another way is to place beside the piece that requires very particular care a small pattern of something about which one is not particular—a pattern for a foundry clamp, for instance, or a cast-iron wedge pattern. Gate all the metal through the unimportant casting. Most of the gas bubbles will be in the clamp or wedge and very little in the particular casting.

Another way some foundrymen eliminate the trouble is to let the ladle of iron stand until the gas has escaped. This is not a good method; the last castings poured with the ladle are liable to turn out bad from cold iron.

Gas from the mold or cores shows in the shape of a violent kicking of the iron out of the risers while pouring. It shows in the casting in the shape of a hollow spot that is sometimes at a distance from the seat of trouble. Break up the casting carefully and trace the hollow spot piece by piece down to its lowest point. It will generally lead to a spot on the core or on the mold that was improperly vented.

Sometimes a runout will cause a hole in a casting that can easily be mistaken for a gas kick. The difference can generally be told by the appearance of the inside surface of the flaw. The flaw from gas will be smooth. The flaw from a runout will show a granular surface with tiny points throughout the shiny interior of the hole.

If the trouble from gas continues make a mold and cut out all the sand from the center of the cope so that the inside of the mold, with its cores, can be seen. Pour the mold and the point that is giving the trouble will be quickly discovered.

Hard ramming will cause a violent boiling of the iron and will give a casting a streaked, wrinkled surface where the iron could not lie quietly against the hard sand. Wet sand will have the same effect.

Cold Iron

More castings are thrown out on account of having been poured with too cold iron than from any other source.

For a brief period in any mold, no matter how softly rammed or well vented or dried, there is a violent passage of gas from the sand into the iron. If the iron is cold and solidifies while this is still going on, the machined faces will be covered with little pit holes or smooth bubble-like hollows. The best way to convince yourself, the foundry foreman, the molder and especially the cupola tender of this is to take a casting that has been poured cold, have it machined early the next morning and bring it back into the foundry as an exhibition. Do this early before anyone has forgotten the cold iron that the casting was poured with.

Iron must come from the cupola dazzling white hot and must be hurried to the molds and poured quickly. Too much iron in the ladle will cause the last molds to be poured cold. Come back to the cupola often. Pour the left-over iron into pig beds and not back into the tapping

ladle. Have the phosphorus in the mixture high enough to keep the iron fluid.

Internal Shrinkage and Sponginess

Internal shrinkage shows in the heaviest part of a casting in the shape of a hole or a spongy place and can often be corrected by turning the pattern over so that the shrinky spot comes in the drag and not in the cope. Sponginess is rarely found in the lowest part of a casting. It can be corrected by putting a chill on the mold at the spongy place or by changing the proportions of the pattern so that all the metal is of the same thickness.

Sponginess very often shows in the bottom of a pocket or angle of a casting, caused by a disturbance of the iron from gas. Venting down into these corners or changing the design so that the angle comes on the inside of the casting instead of the outside will correct the evil. A pocket on the inside of a casting rarely shows sponginess.

A change in the location of the gate and risers will often eliminate shrinkage.

Putting on higher or longer risers will do away with sponginess by increasing the pressure in the mold.

Venting down into corners that show leakage will often correct this evil, as any gas disturbance of the iron in the mold will make a porous spot in the casting at the point of disturbance.

Plates of unequal section are liable to crack. The trouble can be remedied by using a stronger mixture of iron or by using one with a higher total carbon or by changing the location of the gate so that the point that cracks will be the first to cool and not the last or by changing the design of the plate to one of equal section all over.

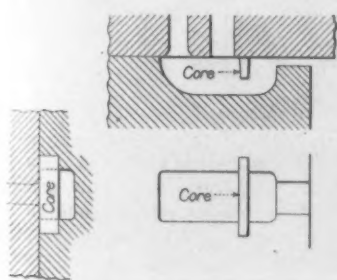
Gating and Pouring

Make a pouring pocket at the top of the gate into which the iron is poured. It will catch the first splash of iron and keep it from going down the gate.

Make a pocket at the bottom end of the gate to catch the first drops of iron and keep them from splashing into the mold. These first drops of iron chill in the mold and make bad spots in the machined faces on castings.

Soften up the gate at the pouring bowl also at the parting with a lifter before slicking these places down. This will prevent the boiling of the iron, which creates dirt.

When pouring be sure to keep the gate choked full of iron to prevent the slag getting into the casting.



Slag Skimming Gate for Molds

Make a skim gate, using a pattern and a core in the manner shown in the illustration. Its advantages are: 1. The sand is soft in the drag. 2. The core acts as a perfect skimmer. 3. Using a pattern instead of cutting by hand makes a clean gate.

A rod for churning should extend into the casting.

A hot poured casting will be softer than one cold poured of the same analysis, for the sand, being heated to a higher degree, will anneal the casting.

Dirt in Castings

Dirt in castings can be caused from sand left in the mold before closing; dirt in the pouring basin at the top of the gate; loose dirt that has fallen in from the top of risers because the molder is careless about leaving the sand ragged at this point.

Dirt may come from a cutting action of the iron in the mold or from a scab on the core or mold or from a crush on the mold. It can come from the blacking washing.

When a casting shows up dirty examine the spot. A fine black powder is blacking.

Whether a casting was lost from a piece of broken core or a piece of the mold can be easily told if limestone is present in the core sand. The molding sand will be black, whereas the core sand will have white particles in it. A careful examination of the casting will show the spot from which the sand came. If it is at the gate the sand was washed away by the rush of iron into the mold, which can be prevented by driving nails over the inside of the mold at this point or by changing the gate.

Washing on heavy castings is frequently caused by using a grade of sand that is suitable for light work only. If the trouble is from a scab on the core it shows that in making the core the sand became loosened and never was pressed back again before drying.

Sometimes the slicking of a wet blacked core with the tool, if not properly done—that is, if the core-maker lets his tool lie too flat against the face while slicking—will loosen the core sand.

If the trouble is from a crush at the parting the molder failed to depress the parting properly by slicking.

A scab on other parts of a casting is caused by the sand buckling out into the casting. The molder rammed too close to the pattern in the spot where the scab occurred.

A poor grade of blacking may wash and make dirty castings.

Adulterated blacking is all right if you do your own adulterating. Buy the finest grade of plumbago at 5 cents per pound and mix it with as much talc, at 1 cent per pound, as will work satisfactorily. Thirty-five per cent. talc and 65 per cent. plumbago for a wet blacking mixture will peel the sand off the heavy castings. Half and half will be all right for the average blacking. Pure talc, with no plumbago, will be found perfectly satisfactory for dry blacking thin plate work.

Blacking often washes because not enough molasses was used to bind it. It washes if put on too thick or if burned in drying.

Put stone coal in the sand pile and mold blacking can be eliminated on certain classes of work.

Allied Machinery Company Changes

Charles E. Carpenter has been appointed general manager of the Allied Machinery Company of America, 55 Wall street, New York, succeeding Capt. Godfrey L. Carden, who resigned to return to duty in the United States Revenue Service. Captain Carden had been with the company since its organization about 18 months ago, having a leave of absence from the Government which expired August 31 last. Mr. Carpenter, who officially took up his new duties September 23, is well known in the machinery trade, having been connected with Schuchardt & Schutte, New York, and having represented the Yale & Towne Mfg. Company abroad for four years. He speaks French and German fluently and has an understanding of European customs which comes from having been abroad in his youth. Mr. Carpenter says he has not surveyed the ground sufficiently to say what changes, if any, will follow his assuming the management of the company, but that the policy of increasing the number of branches in Europe and of expanding trade will be pursued in keeping with original plans. The company now has branch offices in Paris, Brussels and Vienna. C. N. Thorn, the New York manager, is at present in charge in Paris. Mr. Carpenter, in the next two or three weeks, will visit a number of American manufacturers and go abroad in October.

In discussing the utilization of waste heat from gas engines, K. Kutzbach in *Stahl und Eisen* emphasizes that it is impracticable to attempt to allow the jacket water to exceed, say, 105 deg. F. owing to the danger of pre-ignition and that the exhaust gases have a large volume with comparatively low heat content besides corrosive impurities. His argument is not that utilization is not wise but that it is limited.

The General Malleable Company, Warren, Ohio, recently incorporated, has taken over the business of the General Foundry Company of that city.

How to Secure Close-Grained Soft Cast Iron*

Seven Practical Ways of Controlling Graphite, Grain Size and Hardness—Exacting Demands of Machinery Builders

BY JOHN JERMAIN PORTER, STAUNTON, VA.

To most users of castings cast iron is simply cast iron and a casting is satisfactory as long as it is true to pattern, free from shrinkage and gas holes, and soft enough to machine readily. There is, however, a growing demand for cast iron of special properties, and users are becoming educated to the point of demanding castings not only outwardly perfect, but also of material exactly suited to their needs.

A case in point is the demand among machinery builders, and especially the machine tool people, for castings close grained and capable of taking a high polish, and at the same time soft and easily machined. It is surprising what a difference is made in the appearance of the finished machine by the iron used, particularly after it has been in use a short time. An open-grained iron when polished presents a dull gray surface marred by a multitude of little hair lines, due to the rubbing out of the large graphite flakes. On the other hand, a close-grained iron polishes to a white steely surface, very pleasing to the eye, and free from graphite lines except on very close inspection. After a machine has been in service awhile these differences are accentuated, since the open-grained iron absorbs oil and dirt and becomes darker, while the close-grained iron by simply wiping off is restored to its original whiteness.

Machine tool builders take great pains with the appearance of their product and use polished surfaces very freely. At the same time they are not as a rule willing to sacrifice cheapness of production as represented by ease of machining. Hence the demand has been loud and insistent for the combination of close grain and softness, and in some cases such castings will command considerably higher prices.

A Wide Range in Grain Structure

We are accustomed to think of these two properties as being incompatible. To a certain extent this is true, the closest grain going with a very hard iron; but it is also true that for any given degree of hardness there is a wide range in the possible grain structure. The subject is a rather difficult one to study, largely because of the lack of means for definitely measuring and recording grain size. Very little is known as to the real cause of differences in grain structure, and the following notes are presented, not as a complete exposition of the subject, but as summarizing present knowledge, and in the hope of arousing more general interest.

The controlling factor in grain size is no doubt the size of the flakes of graphite, their distribution and number. Other subordinate factors, if any, are obscure and poorly understood. The whiteness of iron as shown on its polished surface is not strictly in proportion to its closeness of grain, but as a general rule the two things go together. A desirable iron must, therefore, have a limited amount of graphite, in small flakes and uniformly distributed. Coming now to practical means of controlling graphite, grain size and hardness, I have classified these under the following heads:

1. Chemical composition.
2. Use of steel scrap, chips, etc.
3. Selection of kind of iron and brands.
4. Use of alloys.
5. Control of rate of cooling.
6. Cupola practice.
7. Practice in machining.

Chemical Composition

The most important element is silicon, which should be kept just as low as possible without hardening the iron too much. Most foundrymen carry an excess of silicon in

order to be on the safe side in the matter of hardness, and this can usually be considerably cut down provided the mixture is under close chemical control.

Sulphur will close the grain if in excessive amount, but only at the cost of hardness and probably other troubles. Personally I do not consider it a safe means to use.

Manganese is ordinarily supposed to have an important influence in closing grain, but I am rather doubtful as to its efficiency. In moderate amounts it probably has some good effect, but an excessive quantity will not only harden, but may actually open the grain, due to the formation of large crystals of manganese carbide.

Phosphorus, within the usual limits, probably has little or no effect on either grain size or hardness.

Use of Steel or Chips in the Mixture

The use of steel scrap and the making of the so-called semi-steel is becoming very common, and where properly handled it is a very excellent means of closing grain and increasing strength. From 10 to 25 per cent. is generally used, and if silicon is properly regulated the hardness will not be materially increased. Of course, the good effects of steel may be nullified by cupola troubles incidental to its use, and the necessity of special precautions when charging it is now generally recognized.

The addition of chips to the charge also has a strong tendency to close the grain, but in this case again precautions must be taken to avoid oxidation and cupola troubles. It is very difficult to understand thoroughly the action of steel and chips in closing the grain. In part it is no doubt due to decrease in the amount of carbon (and graphite) in the casting, but it cannot be all attributed to this cause, as in many cases analyses show the close-grained iron to be quite high in carbon, due, of course, to absorption in the cupola.

Selection of Kind of Iron and Brand

Charcoal iron, if properly used, will give much closer-grained castings than coke iron of equal hardness. There is also a considerable difference in the behavior of different irons of the same class, some brands giving better results than others.* Apparently the difference is due to variations in furnace practice and materials used, but no definite rules can be given and the best brands can only be found by experience.

Use of Alloys

The sellers of certain foundry alloys claim among other things that their addition will close the grain. I have experimented somewhat along this line but without getting any very marked results. The use of either titanium or vanadium alloy seemed to give more uniform and possibly a little closer grain structure, but these results would probably have been more pronounced on a poorer grade of iron.

Control of Rate of Cooling

It is well known that rapid cooling gives smaller grain size and greater hardness. It is common practice to use chills to form the Vees of lathe beds, the size of the chills being so proportioned as to decidedly close the grain and yet not actually chill the iron and make it very difficult or impossible to machine. Cores are also used in some cases where they are not otherwise necessary on account of their cooling power and to close the grain.

Within recent years it has been discovered that cast iron may be made close grained by cooling rapidly through its solidifying temperature and just below, and at the same time soft by cooling slowly through the lower range. This principle is applied in Custer's process of casting in per-

*Presented at the convention of the American Foundrymen's Association, Buffalo, N. Y., September, 1912.

*See also paper by the present writer entitled "Peculiar Properties of Pig Iron," read before the Pittsburgh Foundrymen's Association and printed in the *Foundry* of December, 1911.

manent molds. Castings can be made considerably softer by allowing them to remain in the sand until cold and thus anneal themselves. Since slow cooling through the lower range of temperature probably does not affect the grain size, it follows that a combination of low silicon and prolonged cooling is useful in getting the desired properties of softness and close grain.

Cupola Practice

Bad cupola work is capable of nullifying the effects of almost all of the methods suggested for reducing grain size. It may also produce close grain in combination with hardness through excessive oxidation. It is thought by some that the rate of blowing and blast pressure have a good deal to do with the grain structure of the iron, and it is certainly true that the height of the melting zone and coke bed is, in some cases at least, an important factor. The higher the melting zone and the longer the column of coke through which the iron trickles, the greater the tendency to open grain.

Practice in Machining

It is known to most machinists, but not to all foundrymen, that a good close-grained iron can be made to appear open grained by machining. A heavy roughing cut will pull and tear the iron crystals and for a short distance below the surface produce a very open structure. If now the finishing cut is very light, or if the finish follows directly on the roughing cut the iron will appear very open grained, while with proper treatment it may be entirely satisfactory.

Plant of the Noelke-Richards Iron Works Near Greensburg, Pa.

In the early part of this year the Noelke-Richards Iron Works, steel fabricators, with main offices at Indianapolis, Ind., bought the plant of the Brown-Ketcham Iron Works at Huff Station, on the southwest branch of the Pennsylvania Railroad, about three miles from Greensburg, Pa. The plant had been idle for some time. The purchasers have rebuilt and enlarged the works, and it is now one of the most important steel fabricating plants in the Central West.

The site containing the plant has about nine acres, nearly half of which are covered with buildings, leaving plenty of available ground for future extensions. The main structural shop, of which a view is here presented, is 60 x 500 ft. in size, of steel frame construction, with corrugated siding and roof. The shop contains two 10-ton and 15-ton electric traveling cranes, three spacing tables for punching columns and girders 60 to 70 ft. in length, three single punches for doing small detail work, a shear for cutting plates up to 60 in. wide, a double end planer for planing columns, eight compression riveters, three stationary reamers, and is also equipped with an electric circular saw for cutting beams up to 24 in. in depth.

The beam shop is 44 x 400 ft., also of steel frame construction, with corrugated iron siding and roof. It is equipped with two 5-ton cranes, a flange punch for punching holes in flanges of beams, a large coping machine, one Acme rivet-making machine with a capacity of 5 tons of



View of the Fitting End of the Column Shop, Noelke-Richards Iron Works, Greensburg, Pa.

I have purposely avoided going into theory in this paper, but those who are interested in reasons why I recommend a recent paper by E. Adamson.* In this paper evidence is given to show that several forms of graphite exist, varying considerably in their behavior during the melting and solidification of the iron. In my opinion, this fact is competent to explain most of the differences existing between coke and charcoal pig and between different brands of iron, as well as some of the peculiar effects of steel scrap in the cupola.

The plant of the Blandon Rolling Mill, Blandon, Pa., making grooved pipe skelp, was put in full operation September 23. For the past seven months the 8-in. and 11-in. mills have been working alternately, week about.

*"Temperature Influences on Iron and Carbon," Journal Iron and Steel Institute, No. 11, 1911.

rivets per day, five furnaces for heating rivets, and eight compression riveters. This equipment is adapted for handling Bethlehem H shapes, and also doing a large variety of other work. The template shop is 32 x 60 ft. and is of steel frame construction.

The unloading yard is equipped with two 10-ton electric traveling cranes, each of 60 ft. span, on runways 200 ft. in length, giving ample unloading and handling facilities for material, while the loading yard is equipped with one 20-ton electric traveling crane of 46 ft. span on a 200 ft. runway and also a steel loading derrick of 15-ton capacity operated electrically.

The power house, 40 x 60 ft. in size, of brick construction, contains a 65-h.p. engine and dynamos and motor, two air compressors of 1100 ft. free air per minute capacity and 125 h.p. in boilers. The machine shop contains bolt threader, three lathes, one shaper and a large drill press.

Mechanical and Civil Engineers,
PITTSBURGH, PA.

Titanium in Rail Steel

An Investigation by Max H. Wickhorst, Engineer of Tests for Railroad Engineers

The Bulletin of the American Railway Engineering Association for July, 1912, contains a 70-page report by M. H. Wickhorst, engineer of tests of the Rail Committee of the association, on the "Influence of Titanium on Bessemer Ingots and Rails." There are numerous tables and diagrams, together with reproductions of photographs of split ingots. The author's summation of his report is as follows:

Details of Test Methods

1. A series of seven Bessemer heats was made treated with varying amounts of ferrotitanium; two of the heats were plain steel and the other five were treated with 0.05 per cent., 0.1 per cent., 0.2 per cent., 0.4 per cent. and 0.6 per cent., respectively, of metallic titanium in the form of a cold 15 per cent. alloy shoveled into the steel after blowing and adding the spiegel. From each heat two ingots were selected for this experimental work, one for splitting open and chemical survey and the other to roll in 100-lb. rails for drop tests, tensile tests and cross bending tests of the base.

2. The work was done at Buffalo, N. Y., at the works of the Lackawanna Steel Company, which kindly furnished the steel and all the facilities for the investigation. The ferrotitanium used in these heats was kindly furnished by the Titanium Alloy Mfg. Company.

3. In making the titanium-treated steel, the metal was held in the ladle for three minutes after the addition of the ferrotitanium before pouring into the molds. One of the heats of plain steel was likewise held in the ladle while the other was not. All the heats had been held in the converter for $2\frac{1}{2}$ minutes after blowing and after adding the spiegel. The ingots were made in plain iron molds without any top covering.

4. One ingot from each heat, after being soaked in the usual manner, was set aside to cool and was afterward split open to note its internal condition as to size and distribution of cavities, and to use for obtaining drillings with which to make a chemical survey of the ingot.

Cavities and Segregation

5. The ingots of plain steel each contained a large cavity near the top of the ingot whose appearance indicated it to have been due mostly or entirely to the collection of gas and, in addition, the metal of the upper fifth of the ingot was honeycombed with small holes.

6. With treatments of 0.1 per cent. or over of metallic titanium, the ingots each had a large main cavity, but the metal surrounding it was solid, or practically so, but in addition there was a tapering extension of the cavity downward, apparently due to shrinkage of the metal. With 0.05 per cent. treatment there was a partial solidifying of the above mentioned surrounding metal.

7. A chemical survey was made of the seven ingots by means of 15 samples from each of five vertical rows from one-half of each section face, making a total of 75 samples from each ingot, minus the samples which could not be taken on account of cavities. On each sample determinations were made of carbon, phosphorus, sulphur, manganese and silicon, and on the samples of one ingot, of titanium also.

8. With titanium treatments of 0.1 per cent. or over of metallic titanium, the segregation of carbon, phosphorus and sulphur was much less than in the plain Bessemer steel, but with 0.05 per cent. treatment the segregation was not less than in the plain steel.

9. The negative segregation which occurs in the interior and lower part of the ingot seems to have been not greatly influenced by the titanium treatment, but with treatments of 0.1 per cent. or over of metallic titanium there was not a concentrated collection of the segregating elements, carbon, phosphorus and sulphur, in the interior and upper part of the ingot.

10. With treatments of 0.05 per cent. and 0.1 per cent. of metallic titanium, the steel contained only traces of titanium, and with treatments of 0.2, 0.4 and 0.6 per cent. the steel contained a little over 0.02 per cent. titanium.

Physical Tests

11. The entire rail bar of each of the ingots used for rails was used for drop tests, tensile tests and cross bending tests of the base, and was divided into units of one-third rail length, or 11 ft. each. From each 11 ft., 1 ft. was cut for tensile test and base test, then 5 ft. for drop test with the head in tension and the other 5 ft. was used for drop test with the base in tension.

12. The treatment with titanium improved the ductility, as measured in the drop test, of rail made from the upper fourth of the ingot, and more when tested with the head in tension than with the base in tension. The treatment had little, if any, influence on the ductility in the drop test of rail made from the lower three-fourths of the ingot. The influence of titanium in this respect seemed not to be dependent on the amount used within the range of the amounts used in this work of 0.05 per cent. to 0.6 per cent. metallic titanium and introduced by throwing the alloy into the pouring ladle.

13. Rails made of Bessemer steel treated with 0.1 per cent. or more of metallic titanium contained large internal flaws at distances varying from about 10 to 18 per cent. by weight from the top of the ingot. With plain Bessemer steel or with 0.05 per cent. treatment internal flaws were absent or were close to the top. The ingots had been made by pouring the steel into plain iron molds and on top covering was used on the steel after pouring.

14. The titanium treatment seemed to have no influence on the deflection of the rails in the drop test.

15. Tensile tests were made from each third of a rail length along each of the rail bars, one sample from the upper corner of the head, one from the interior of the head near the web, and the other from the flange.

16. The tensile strength was influenced but little by the titanium treatment. The exterior portions of the rail bar averaged, roughly, about 115,000 lb. per sq. in. in the part of the bar below 10 to 20 per cent. from the top of the ingot. Close to the top end of the bar, the strength averaged about 5,000 lb. lower. The tensile strength of the interior metal varied in any one bar within a range of 15,000 or 20,000 lb. per sq. in. The maximum was, roughly, 122,000 to 131,000 and the minimum was in general 15,000 or 20,000 lb. lower. The differences were somewhat greater with the titanium-treated bars than with the plain ones.

17. The tensile strength of the interior metal varied in a general way with the distribution of carbon; that is, it was a maximum at about one-fourth way down the ingot and a minimum at about 85 per cent. down from the top.

18. The exterior metal showed good ductility in the tensile test in all the rail bars. The interior of the head also showed good ductility in the lower two-thirds of the rail bar in all the bars, but in the upper third of the bar the two bars made of plain Bessemer steel had a zone of low ductility running from about 15 per cent. by weight from the top of the ingot to about 30 per cent. down. The titanium-treated bars showed good ductility in this region, although not as good as higher up or lower down in the bars.

19. Cross bending tests were made of the base of one-half inch sections cut from each one-third of a rail length along each bar. The base was supported on blocks near the edges of the flanges and the section given blows with a heavy machinist's hammer until the base was broken, and the amount of bending of the base was measured.

20. The cross bends of the base varied considerably in most bars from one end of the bar to the other, but there was no relation between the amount of cross bend and the distance from the top end of the ingot. The titanium treatment also seemed not to influence the result in the cross bending test of the base.

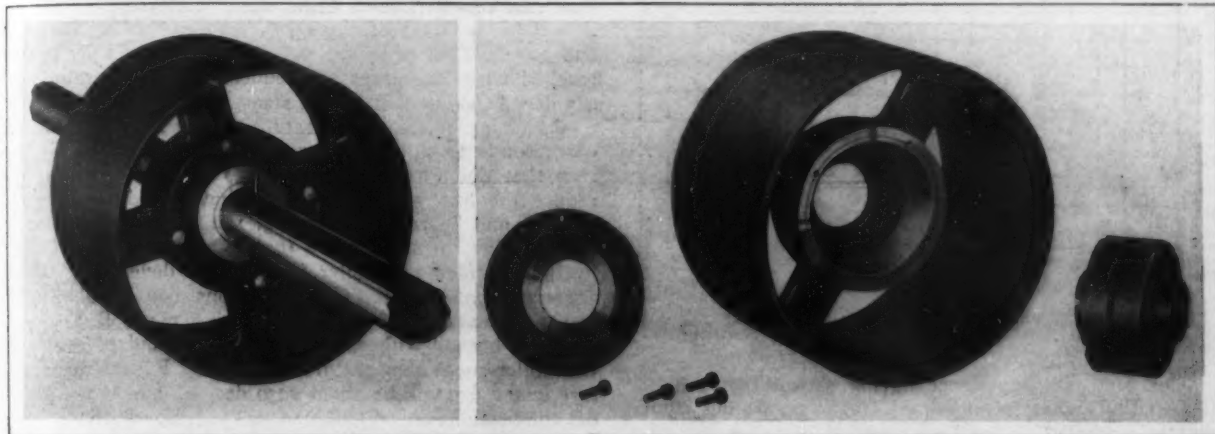
Conclusions

21. To sum up: the use of amounts of 0.1 per cent. or more of metallic titanium in the manner described prevents the "honeycombed" condition of the upper part of ingot found in plain Bessemer steel, but is also attended with a larger and deeper "pipe." The heavy segregation or concentration of carbon, phosphorus and sulphur found in the interior and upper part of ingots of plain Bessemer steel is largely avoided, but the mild negative segregation found in the interior and lower part of the ingot is not materially altered. The brittle zone found in rail of plain Bessemer steel from the upper part of the ingot, as de-

terminated by drop and tensile tests, was avoided, but the properties of the rail from the lower two-thirds of the ingot were not changed. Large internal flaws were found in rail considerably lower down from the top of the ingot with steel treated as mentioned than in rail made from plain steel. Treatments with 0.05 per cent. metallic titanium produced the above results only in part, but treatments above 0.1 per cent. had only little additional influence.

New Self-Oiling Loose Pulley

A self-oiling loose pulley of simple construction has recently been placed on the market by the Cleveland Clutch Company, 224 High street, Cleveland, Ohio. One of the



The New Self-Oiling Loose Pulley Made by the Cleveland Clutch Company, Cleveland, Ohio

most interesting features of this pulley is the simple and unique manner of retaining the oil. The pulley consists of a bearing spindle that fits into a drum, the drum being connected to the outer surface by four spokes. The surface of the spindle is divided into two sections and grooved crossways. These grooves provide channels for the oil and reduce the friction surface so that it is no larger than it would be were the pulley running directly on the shaft. The bearing spindle is attached to the shaft by set screws. After the pulley is in place the cap is fastened to the drum by screws inclosing the bearing in an oil-tight reservoir. This reservoir is kept partly filled with oil which is supplied through an oil hole in the cap. It is stated that when once oiled the pulley requires no attention for months. Other advantages claimed for the pulley are that it is dust and dirtproof, has no vibration or torsion, is efficient at all speeds, does not wear the shaft and is easily mounted on a damaged shaft.

The pulley is made in all sizes from a minimum of 6 in. in diameter with a 2-in. face.

The American Stove Company, with main offices in St. Louis, Mo., has completed plans for the issue of \$2,000,000 more stock, one-half to go to the stockholders as a dividend and one-half to be offered to employees. The present capital stock is \$5,000,000. The company controls the following concerns manufacturing gasoline and gas stoves: Ringen Stove Company, Quickmeal Stove Company and Twin Burner Vapor Stove Company, of St. Louis; George M. Clark & Co., Chicago; Schneider & Trenkamp Company, Standard Lighting Company and Dangler Stove & Mfg. Co., Cleveland; National Vapor Stove & Mfg. Company, Lorain, Ohio, and Monarch Stove & Mfg. Company, Mansfield, Ohio.

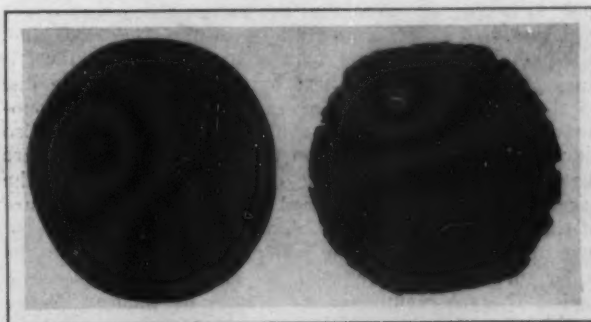
The Augustine Rotary Mill & Factory Engine Company, recently organized with a capital stock of \$500,000, has acquired the plant of the Reeves Engineering Company, Mount Vernon, Ohio, and will manufacture a rotary engine invented by E. F. Augustine of Buffalo, N. Y. The new company has been overhauling the Reeves plant, and it will be placed in operation shortly. The Reeves gasoline engine will also be made. The officers of the company are: P. S. Kelsner, Mount Vernon, president; E. F. Augustine, Buffalo, vice-president, and D. B. Grubbs, Columbus, secretary.

A Test of Titanium as a Deoxidizer

An interesting experiment was recently made to show the effect of titanium when used as a deoxidizer in steel. Two cakes of Bessemer steel were cast from two separate heats. One was plain Bessemer, and the other the same steel but treated with titanium. The composition of the steel in both heats was identical, the analysis being: carbon, 0.60 per cent.; manganese, 0.10 per cent.; silicon, 0.10 per cent.; phosphorus and sulphur under 0.040 per cent. The cakes of steel were flattened under the hammer from cones 2 in. high and 2 in. in diameter across the base and 1¼ in. across the tops. The cones were cast in small iron chills which were grasped by tongs and held under

the stream of molten steel as it ran from the ladle into the ingot molds. The cones were allowed to cool in the mold, then were reheated and placed on the anvil of the hammer; a thin hooked rod was laid on the top of the cone and was welded to the latter by the first stroke of the hammer, forming a handle by which the cone could be steadied and turned under the blows, allowing both sides to be hammered equally.

The cone of steel that was untreated with titanium cracked and split all around the edges, as shown by the ragged outline of one of the illustrations, while the cone of steel



Effect of Hammering Steel with and without Titanium Deoxidizing Treatment

treated with titanium did not exhibit the slightest tendency to crack, the outline of the disk being smooth and uniform. This fact is taken to indicate the degree of toughness and ductility the steel is given by the elimination of the oxygen and the oxides that are held in solution in the metal. The amount of metallic titanium required to effect this improvement was not more than 0.10 per cent., which was added as electrically smelted 15 per cent. ferro-titanium obtained from the Titanium Alloy Mfg. Company, Niagara Falls, N. Y. Sixteen pounds of ferro-titanium were used in each gross ton of steel, and the cost of treatment is given as about \$1.28 per ton, a low figure in view of the improvement effected in the quality of the steel.

The Pratt & Whitney Company has opened an office and sales room for small tools and gauges at 336 West Fourth street, Cincinnati, Ohio, in charge of C. M. Pond.

Increasing Steam Boiler Efficiency

Details of an Economical Method of Absorbing Heat from the Gases of Combustion

BY GEORGE H. GIBSON, NEW YORK CITY

The redesigning of boilers and steam generating plants is receiving widespread attention at the present time. Instead of 8, 10 or 12 sq. ft. of heat transmitting surface for each boiler horsepower which was formerly considered good practice, designers of large plants are now adopting

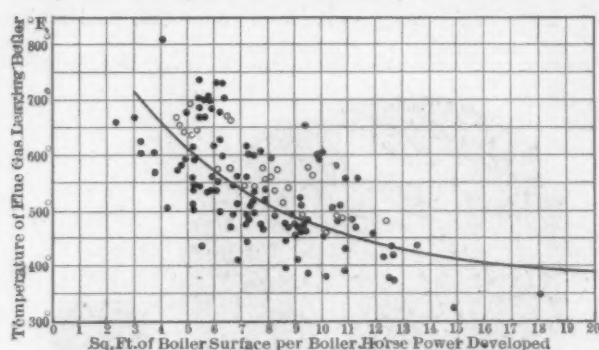


Fig. 1.—Chart Showing Flue Gas Temperatures Corresponding to Different Rates of Driving Boiler Heating Surface

4, 5, or 6 sq. ft., experience having shown that this results in the highest economy of steam generating equipment as a whole. It has been asserted that the operation of boilers at these higher rates will involve greater danger of burning plates and tubes. This statement, however, is based on a misconception, since the temperature of the fire has not necessarily been changed in any way and the rate of heat transmission at the point where the gases first strike the tubes has not been modified. In other words, the maximum rate at which the boiler surface transmits heat and consequently the heating of the metal is no greater than before, the average rate alone having been increased. Under these circumstances the real limit of the capacity of the boiler becomes, not the ability to transfer heat, but rather the ability to circulate the water rapidly enough to keep the surfaces wet and to disengage the steam from the water, problems which are now being attacked and solved by the leading boiler builders. It is true, however, that the curtailed heating surface will result in higher temperatures of the flue gases and, although it may not pay to add more boiler surface, it does pay to recover the heat by economizer surface due to the lower temperature of the contents of the economizer as compared to the contents of the boiler. Also since the annual charges upon the economizer surface are lower as compared to those on the boiler surface, the gases can profitably be reduced nearer to the temperature of the water entering the economizer than to the temperature of the contents of the boiler. The result is that the boiler surface can be reduced, the efficiency increased and capital charges maintained as before, or reduced, by an intelligent utilization of the counter-current principle as embodied in a combination of boiler and economizer.

Two principal items enter into the cost of the generation of steam, one of these is the expense for fuel and the other that for interest, depreciation, labor and other fixed charges upon the boiler, boiler setting, grate, draft apparatus and fittings. An increase in the amount of boiler surface employed to evaporate 30 lb. of water per hour, which is the unit for a boiler horsepower, will, within the limits of ordinary operation, also result in an increase in the amount of heat secured from each pound of fuel consumed. This in turn will result in the absorption of more heat and the gases will be discharged to the stack and to the atmosphere at a lower temperature, as is graphically shown in Fig. 1, which has been made up from the temperature readings of flue gases taken in numerous boiler tests, the points in circles being from the famous Delray tests by Professor Jacobus upon a Stirling boiler. While the cost of steam is being reduced by increasing the efficiency of heat absorption, the element of cost which is due to the fixed charges on the boiler and its appurtenances is rising. The rate at which heat is absorbed by any element of the boiler surface depends entirely upon

the difference between the temperature of the contents of the boiler and the temperature of the gases of combustion in contact with that part of the boiler. If the amount of heat absorbed by any particular part of the boiler is more than the corresponding fixed charges, it is, of course, obvious that that particular element of heating surface is paying for itself. It is also apparent that as the temperature of the gases falls and approaches the temperature of the steam and water within the boiler, a point will be reached where the heat absorbed will no longer pay the fixed charges upon the additional boiler surface. The exact point at which this limit is fixed will depend upon three things: the price of fuel, the charges upon the boiler surface and the proportion of the whole time that this surface is being used. Referring to Fig. 2, it will be seen that for plants operating 10 hr. per day and 300 days per year, the limit with coal at \$3 per ton is reached when the gases are reduced to a temperature of 285 deg. F. above that of the steam.

Assuming steam at a pressure of 150 lb. gauge, which corresponds to a temperature of 366 deg. F., it will be seen that the lowest temperature to which it will pay to reduce the flue gases under the above conditions is 650 deg. F., and by referring to Fig. 1 it will be seen that it will not pay to put in more than 4 or 5 sq. ft. of boiler heating surface per boiler horsepower developed. It is apparent that under these conditions considerable heat would be wasted and if coal containing 14,000 B. t. u. per pound is burned with 26 lb. of air per pound of coal and the boiler-room temperature is 70 deg. F., the temperature in the fire will be about 2230 deg. F., and if the gases of combustion are discharged at a temperature of 650 deg., approximately 27 per cent. of the total heat of the fuel will be lost in the chimney gases. If there were no body colder than the water and the steam within the boiler to take up the heat from these gases this loss would be unavoidable, but the heat can be used for warming up the cold water which is to be fed to the boiler. The initial temperature of this feed water varies all the way from 50 to 210 deg. F., depending upon whether the source of supply is a well or stream or whether the returns from heating and drying coils or water heated in an exhaust steam feed-water heater are employed. If the initial temperature of the water is 200 deg. F., the difference between this water and the flue gases at a temperature of 650 deg. F. is only 450 deg. F., which would make it profitable to provide additional heating surface.

If the water was sent directly into the boiler it would be heated up to the boiler temperature by the steam and water already there and no opportunity would be afforded for it to absorb the heat from the gases of combustion. A remedy for this condition of affairs is to divide the process of steam generation into two parts, one of which consists of heating the water up to the boiling point and

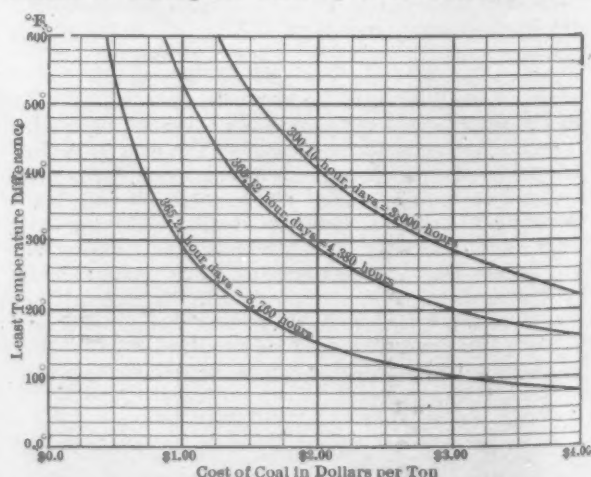


Fig. 2.—Chart Showing the Point at Which Boiler Surface Ceases to Pay Dividends for Different Conditions

the other the operation of boiling the water. This is known as the counter-current principle and it has been utilized by the Green Fuel Economizer Company, Matteawan, N. Y., in its fuel economizer, a sectional elevation showing the way in which the boiler and the economizer are connected being reproduced in Fig. 3. The cost of the economizer is somewhat less per square foot of

heating surface than a boiler and it is emphasized that the temperature difference at which it ceases to be profitable is lower, as will be noticed from Fig. 4. Assuming the same conditions as in the case of the boiler in the previous example, that is, fuel at \$3 per ton and a plant operation of 3000 hr. per year, it will be seen that the

The truth of this equation is apparent as the first fraction in the left member is the cost of a heat unit absorbed by the boiler when the fixed charges are considered only and the second fraction is the cost of a heat

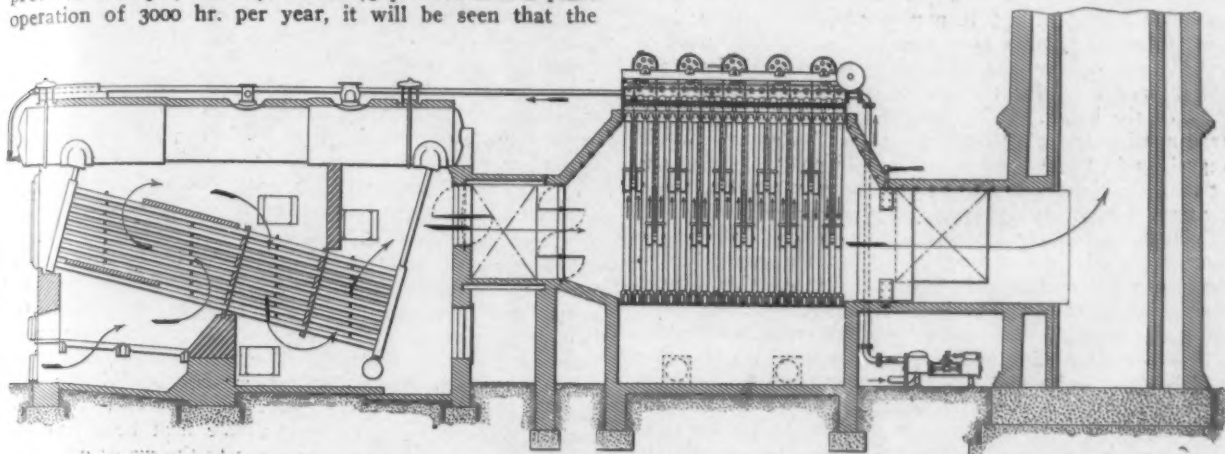


Fig. 3—Sectional Elevation of a Green Fuel Economizer Installed in Connection with a Water Tube Boiler Showing the Utilization of the Counter-Current Principle in Steam Generation

lowest economical temperature difference is about 110 deg. F. With an initial temperature of the feed water of 200 deg. F., the final temperature of the flue gases will be 310 deg. F., which is still hot enough to produce sufficient draft with a good chimney.

In view of the momentous nature of the conclusions to which the charts of Figs. 2 and 4 lead, an account of

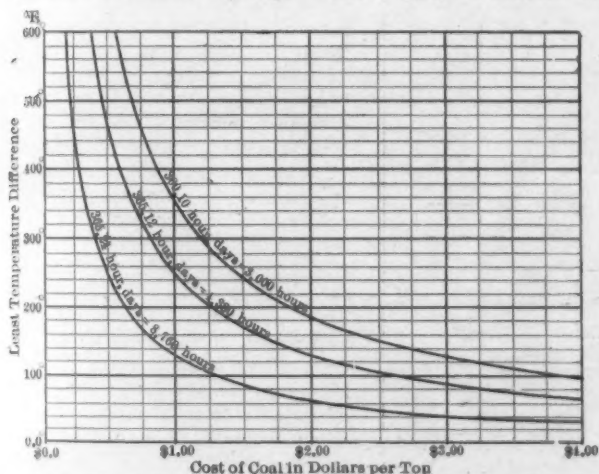


Fig. 4—Chart Showing Point Where Economizer Surface Ceases to Pay Dividends

the method by which they have been constructed is in order. The curve in Fig. 2 shows the least temperature difference that is profitable between the gases leaving the boiler and the steam in the boiler. In other words, if the difference in temperature is less than is shown on the chart, too much boiler surface has been installed for economy, and if it is greater more boiler surface could be installed to advantage, although economizer surface would be even better.

Assuming that,

S = the number of square feet of boiler surface.

A = the annual charge upon a square foot of boiler surface.

Y = the number of hours per year that the boiler surface is operated.

Q = the number of heat units transmitted per hour.

C = the cost of coal per ton.

T_1 = the initial temperature of the gases of combustion.

T_2 = the temperature of the gases of combustion as they leave the boiler.

T_r = the temperature of the atmosphere.

H = the number of thermal units per pound of coal.

K_2 = the average rate of heat transmission in the last pass of the boiler.

D = the lowest difference between the temperature of the gases of combustion and the boiler contents for which it is profitable to install boiler heating surface.

From the foregoing we have the equation:

$$\frac{SA}{YQ} + \frac{C}{(T_1 - T_2)H \times 2000} = \frac{A}{D K_2 Y}$$

unit where the fuel charges alone are considered. If another square foot is added to an existing boiler that space must absorb enough heat to pay its own fixed charges, basing the value of the heat on the cost of heat as obtained from that part of the boiler already installed. When the cost of heat from the additional surface as shown by the right member is just equal to the cost of heat from the surface already installed a change is made from profit to loss in adding additional boiler surface. The second member can, therefore, be increased until the cost of heat obtained from the additional surface is equal to the first member, the increase being proportional to the decrease in the value of D .

The difficulty in solving this equation lies in finding the mathematical relations between the quantities S , K_2 , Q , T_1 and T_2 . Attempts to establish these relations from purely physical considerations have so far failed because it is not known just how K_2 depends upon the difference in temperature between the contents of the boiler and the gases, upon the velocity of the gases, upon the absolute temperature, etc. In the case of commercial boilers, however, this relation can be established by tabulating the results obtained by boiler tests, as has been done in the chart shown in Fig. 1. If S be taken as the number of square feet per boiler horsepower developed, Q is the number of heat units per boiler horsepower hour, or 33,300. Assuming S equal to 5 sq. ft., T_2 from Fig. 1, is found to be about 500 deg. F., T_1 is then H divided by $0.24 G + T_r$, where G is the number of pounds of gases of combustion per pound of fuel. In the present case G is assumed to be 27; H , 14,500; T_r , 70 deg. F., and K_2 , $2\frac{1}{2}$ B. t. u. per sq. ft. per hr. per degree difference.

In finding the value of A it will be assumed that the first cost of the boiler and setting is \$15 per nominal boiler horsepower of 10 sq. ft., and one-half that figure for the stoker, grate and draft apparatus. The annual fixed charge represented by the interest on this investment and the amount that must be laid aside yearly to pro-



Fig. 5—An Installation in the Plant of the Dan River Power & Mfg. Company of Three Fuel Economizers Built by the Green Fuel Economizer Company, Matteawan, N. Y.

vide for the indefinite continuance of the plant is taken on the basis of interest at 5 per cent. and sinking fund and maintenance charges at 12 per cent., giving a total annual expense, excluding fuel, of \$3.40 per nominal boiler horsepower, or 34c. per square foot. The value assumed for K , of $2\frac{1}{2}$ B. t. u. per square foot per hour per degree difference is a figure frequently assumed in calculating economizers and there is no reason why it should not hold for the conditions existing in the last pass of the boiler. It is true that the coefficient of heat transmission is higher than this in the boiler as a whole, especially in those parts which are in contact with gases at a much higher absolute temperature and higher velocity, and it is much higher in those parts of the boiler receiving heat by direct radiation from the fuel bed. However, since all the other conditions are the same, there is no reason for assuming that the heat transmission through the boiler tubes is better than through economizer tubes, except as it may be affected by the difference in diameter. The economizer tubes are constantly scraped, so that they will be freer from soot than the boiler tubes. The thickness of the iron has a practically negligible influence considering that the far greater part of the resistance to the transmission of heat is in the gas film outside the tube compared to which the resistance of iron is inconsiderable. In other words, there is a good reason for believing that with the same gas and water temperatures

In the design of large steam power plants, such as central stations for electric light and power in the large cities, electric traction systems, etc., the boiler surface is being considerably curtailed, while the efficiency of the heat absorption is maintained or even improved by substituting the cheaper and more effective economizer surface. A typical example of this use of economizers is found at the plant of the Dan River Power & Mfg. Company, where three economizers have been installed, as shown in Fig. 5. Two of these contain 560 pipes each and receive the gases from three boilers rated at 542 hp. apiece, or 3252 boiler horsepower, for the two economizers. The third unit contains 400 pipes and receives the hot gases from about 1000 boiler horsepower capacity.

Other causes have also led to the increased adoption of economizers, and among these may be mentioned the tendency toward higher steam pressures, 200 lb. per square inch being not uncommon in steam turbine plants. It is at once apparent that any increase in the steam pressure with an accompanying increase in the boiler temperature renders the boiler surface correspondingly less efficient in the absorption of heat from the gases of combustion since it reduces the available heat head producing the flow of heat from the gases to the water or steam and as a result leaves a greater duty to be performed by the economizer, with the result that the latter is correspondingly more profitable. Another factor in favor of the economizer is the greater efficiency which can be obtained from auxiliary apparatus such as boiler feed pumps, circulating

pumps, fan engines, stoker engines, etc. The smaller the amount of steam consumed by these appliances the less exhaust there is available to heat the feed water in exhaust heaters, so that instead of obtaining temperatures of 200 or 210 deg. F., with some exhaust to waste, in some cases difficulty is experienced in maintaining a temperature of 160 deg. F. in the water leaving the heater. It naturally follows that the colder the water entering the economizer the greater will be the activity of the surface in transmitting heat to the water from the gases. The large heat and water storage capacity of the economizer which gives it the ability to deliver large quantities of hot water in a short time, as when water is drawn from the boilers for filling dye or wash tubs or when excessive drafts are made for steam for any purpose, is another factor of special importance in many plants. Although in the latter case the

SAVINGS PER 8760 HRS. PER
SQ. FT. OF ECON. SURFACE

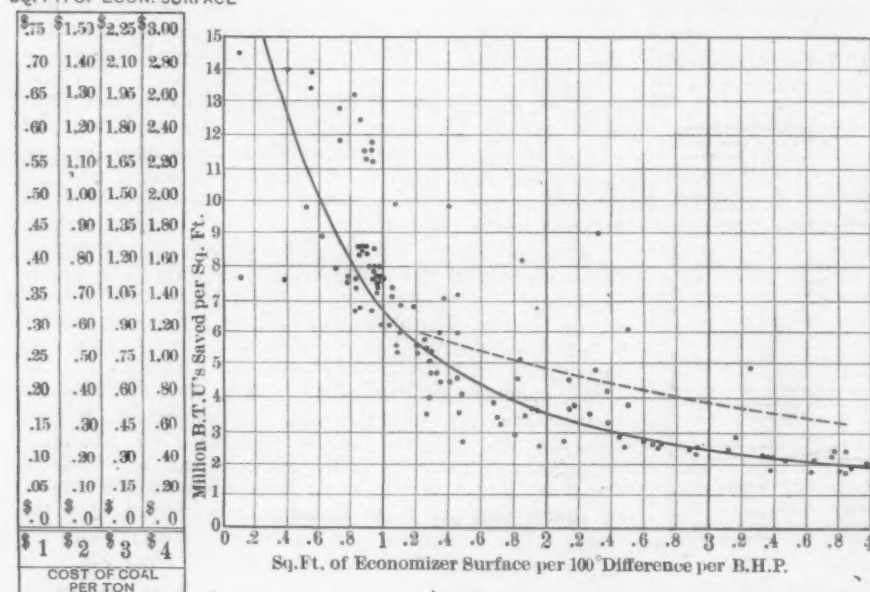


Fig. 6—The Heat and Money Saved Each Year by 1 Sq. Ft. of Economizer Surface Under Varying Conditions of Boiler Surface and Temperature Difference Based on Actual Results in a Number of Plants

and velocities the difference between the performances of economizer tubes and boiler tubes would be very small.

In applying the formula given for Fig. 2 to the economizer surface, as in Fig. 4, it is only necessary to insert in the second member the value of A for economizer surface, which is the same thing as saying that the limit for economizer surface is reached when each heat unit recovered by it costs just as much as it does when produced by the boiler. This, of course, is not quite exact in determining the most economical final temperature difference, since to do so the cost of heat recovered by an additional square foot of economizer surface should be figured against the cost of all the heat recovered by the preceding surface, including both the boiler and the economizer. The difference, however, is not great enough to be worth while, taking into consideration for this purpose especially as the theory indicates final temperatures much lower than ordinary temperatures with natural draft. For the economizer A has been figured on the basis of a cost of \$1 per square foot installed and 12 per cent. for interest, depreciation, maintenance, power and attendance, making a total annual charge per square foot of 12c., although with present prices it would be more exact to take the cost of economizer surface at \$1.20 per square foot and the annual charge as 14 or 15c.

economizer does not furnish the steam directly, it nevertheless assists the boiler surface by supplying to it water upon which part of the work of steam making has already been performed and thus reducing the proportion of work which must be performed by the boiler in transmitting heat to the water.

Briefly, the fuel saving to be expected from the installation of economizers may be estimated at the rate of 1 per cent. for each 10 deg. F. through which the temperature of the water is raised or in the average plant 1 per cent. for each 20 deg. F. by which the temperature of the flue gases is reduced. As the determination of the number of degrees that the water will be heated or the gases reduced in temperature by an economizer of given size involves considerable calculation and some knowledge of economizer engineering, it is more convenient to use a chart, such as the one reproduced in Fig. 6, which is based upon the actual results secured in some 200 plants where economizers have been installed. If in a plant burning \$3 coal and operating 3000 hr. per year it is decided that the economizer should show a gross saving of 30c. per square foot per year, since the chart is laid out for 24-hr. operation 365 days per year, or a total of 8760 hr., it will be necessary for a square foot of surface to earn a rate approximately three times as great as the desired saving, because the plant is operated only about one-

third of the time for which the chart is made out. The rate of earning will, therefore, be 90c. on the basis of the time for which the chart is made out and finding the desired saving in the \$3 coal column, this point is carried across horizontally until the curve is intercepted, from which it will be seen that 1.1 sq. ft. of surface should be installed per boiler horsepower developed for each 100 deg. F. difference between the temperature of the flue gases and that of the water entering the economizer. If the difference in temperature between these two is 450 deg. F. it will be seen that 5 sq. ft. of economizer surface should be installed for each boiler horsepower developed or for every 30 lb. of water that is evaporated into steam per hour.

The Grading of Pig Iron*

Examples from Experience Showing That Chemistry Is the Buyer's Best Dependence

BY THOS. D. WEST, CLEVELAND

One would hardly think that in these days of foundry enlightenment grading by fracture is still advocated, but that such is the case is indicated by a recent publication, as well as the disinclination of a national foundrymen's association in Europe to go on record as abandoning grading by fracture in favor of purchasing pig iron by analysis only. Were not such advocacy a distinct step backward, in that it scares off the foundryman just ready to adopt the advanced method of handling his metallurgical problems, it would be a sheer waste of time to discuss the question at all; for the man does not live who can reliably define by the fracture of the pig metal of our current brands the character of the casting this will produce when remelted. Any attempt to do this is the merest guesswork.

On one point, for example—were grading by fracture reliable—we would have to revise our present conception, and that is the effect of the rate of cooling, so far as it influences the formation of a chill, also the size and structure of the crystals in gray iron castings.

In the old days, when fracture grading was in vogue, and the predictions made did not come true, it was laid to taking iron from the wrong pile in the yard, or to the coke being exceptionally dirty. Hard iron or steel might have been mixed with the scrap, the charges badly mixed or laid on uneven. Then again the coke might have been too soft for that pig iron, or the blast not strong enough, or even too much; there was damp atmosphere or too small a bull-ladle; iron right, but molds wrong—in short, anything but an admission of the wrong guess in fracture grading. Even to-day there is added in such cases the possible excuse of high sulphur in the coke.

A Test of Fracture Grading

One of the best opportunities to test out the grading-by-fracture delusion may be had at the present time around many of our blast furnaces. Here are oftentimes big tonnages of unsalable iron, piled nicely, showing the fracture, and all properly analyzed. Any advocate of grading by fracture can make his guesses without restriction. This brings to mind an incident occurring about 1894, while the writer was in the midst of his combat against grading by fracture and advocating working by analysis only. A good friend and old-time expert furnaceman was belittling chemistry, and claimed that he could judge any iron by its fracture. Knowing that there had been some errors made in his records of analyses of several thousand tons of pig iron then at this furnaceman's yard, and also that all the piles on being re-analyzed had had the numbered samples placed in one pile of about ten tons, the writer challenged his friend to determine the grade of a large number of these samples by his fracture experience. This challenge was readily accepted, and the expert started in to guess of each sample, as it was handed him, whether it would produce a soft, medium or hard iron in a 3/4-in. thick casting, on being remelted. An assistant recorded the predictions carefully. When compared with analyses they indicated that less than one-third of the guesses would have proved correct; and while previously the furnaceman

had readily admitted that the composition of a pig iron regulated the resulting casting in the main, he was so filled up with reasons for unexpected results that he had never thought of giving himself the test the writer imposed.

Car Wheel Foundry Practice

As was but natural, many foundrymen were unable to use chemistry intelligently in the early days, and this is eagerly grasped by those who do not wish to inform themselves upon the why and wherefore of the change. One of the most striking proofs that by the use of chemistry in the foundry rapid tests of the resulting molten iron can be made with remarkable success is given by car wheel works. Without purchasing and mixing their pig iron by analysis, it would not be possible for them to get the remarkable uniformity in the little chill blocks cast every tap, let stand five minutes or so after solidifying, plunged into water and broken to display the fracture. These blocks, from 2 in. by 2 1/2 in. by about 8 in. long, with one side chilled to show the character of the metal as it would be found in the chilled part of the wheel, can be made to show an almost perfect uniformity day in and day out. This is only possible when analysis is used to base the work upon. Considering that wheel foundries make from 200 up to 1000 wheels per day, and that the inspection and tests are most rigid—human life depending upon their integrity—the certainty arising from knowing exactly what went into the cupola is vastly preferable to the mystery of the fracture expert.

A Blast Furnace Experience

From 1892 to 1905 the writer was shop manager of a foundry melting 100 to 150 tons of metal daily, most of which went into a specialty as exacting for uniformity of material as the product of any car wheel shop. A specific brand of iron was required, being delivered in cars and by buggies from a neighboring furnace. In the early days the cupola man would often object to the delivery because of white and spongy fractures exhibited by broken pigs. Proximity to the furnace allowed close tab to be had on their burden, and if no change had been made in ores or coke these suspicious casts were simply held up until an analysis showed whether they were of the desired composition. If so, in they went. Formerly such iron would not have been received. The resulting castings always showed the nice gray open fracture desired in them. The cupola man, by the way, was soon brought to accustom himself to the changed conditions, and so long as he knew of no change in the furnace operation—which he was able to check also—he was quite content.

Judging brands and grades of pig iron are two different propositions. We can readily tell charcoal pig from coke. But as between two foundry irons or Bessemer irons it is difficult to distinguish. In fact, it is practically impossible to do so. A change in the ores used by a furnace really creates a new brand, and even with the same analyses two irons from the same furnace made of different ores are apt to give different results when remelted.

The only proper physical test of quality in pig irons is to remelt them and cast test bars of standard size and under standard conditions. With this knowledge, and the comparison of other such tests of brands, the founder is reasonably safe to go ahead with a new brand. Why those who claim the ability to define the grades of brands have not also claimed the same for changes in these brands, can only be attributed to the fact that their grandfathers have not handed this claim down to them. It would have been just so much more mystery and guessing.

The Strauss Bascule Bridge Company, 104 South Michigan avenue, Chicago, announces its appointment as designing engineer for two 175-ft. single leaf four-track bascule bridges over Bronx Kills for the New York Connecting Railroad Company (of which Gustav Lindenthal is consulting engineer), to be built as stationary spans with provision for conversion into bascules later; a combined railroad and highway bridge 3000 ft. long across the Arkansas River at Pine Bluff, Ark., comprising one 245-ft. Strauss direct lift span, five 245-ft. stationary spans (any one of which can be converted into a lift span if desired), one 140-ft. fixed span, and 1390 ft. of trestle approaches; also a number of smaller bascules.

*Presented at the Buffalo convention of the American Foundrymen's Association, September, 1912.

A New Oil Burner

The Tacchella Device for Low Grade Fuels

For using low grade oils as low as 19 deg. Baume scale, such as crude oil, fuel oil and distillate, Tacchella & Krieger, 916 Victoria Building, St. Louis, Mo., have placed on the market a new type of oil burning device, which is the invention of Adolf Tacchella. The device

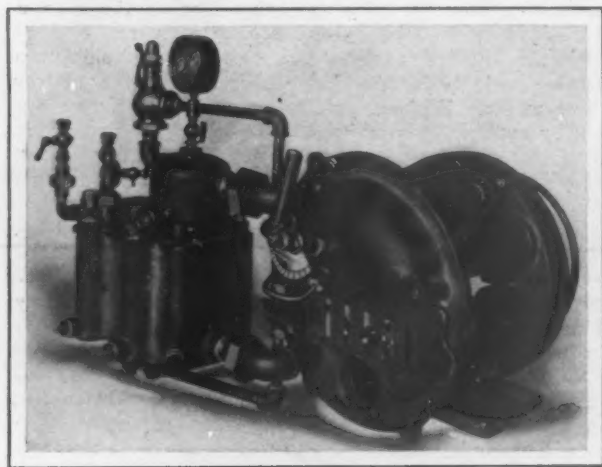


Fig. 1—An Improved Type of Oil Burner Made by Tacchella & Krieger, St. Louis, Mo.

is self-contained and is independent of any outside medium for atomization pressure, such as steam or compressed air. It is of the low-pressure type, using its own steam pressure at between 6 and 10 lb. per sq. in. The special feature of the oil burning device is the well balanced regulation between the steam generator and the oil supply, which is said to be closer than with any other type of oil burning apparatus. Fig. 1 is a view of the burner upon which patents are pending, and Fig. 2 shows the front and side elevations and the arrangement of the various parts.

In the oil regulator the oil is kept at a constant level by a float valve mechanism. The regulator is connected with the burner by a pipe so that the level in the burner supply pipe is the same as that in the regulator from which the aspirating or suction effect causes the oil to be taken to the nozzle. The water regulator is connected with the city water supply and a constant level is maintained here by a float valve mechanism as well as in the steam generator, which is supplied through the lower

air mixing chamber serves to mix the products of atomization with preheated air. This is supplied by the pre-heating chamber, which is connected at the lower end with the outside of the furnace. All of these parts are assembled on a frame, which has a door with a damper for the regulation of the secondary air supply. The pressure gauge, which is attached to the water regulator, shows the working pressure at all times and a safety valve, set to operate at 10 lb., serves to relieve the steam pressure.

In the operation of the oil burning device, a connection is made between the oil regulator and the pipe leading to the starting oil pan by a three-way cock. A small quantity of oil is allowed to pass into this pan, which has some asbestos cord as a wick, and the oil is lighted by a match. Within a few minutes this free burning oil will generate sufficient steam in the generator to bring the pressure up to 3 or 4 lb., which is enough to start the burner. This cock also makes connection between the oil regulating vessel and the burner, and by opening the burner needle valve, steam will pass through the steam nozzle and bring oil to the oil nozzle by its aspirating effect. Here it is atomized into a very fine spray and this mixture of oil vapor and air will ignite at once, the flame being regulated by adjusting the opening of the burner needle valve. The longer the flame the greater the amount of steam will be generated and the stronger will be the suction effect, while the reverse is true when the flame is made smaller. The flame can be regulated from 8 in. to 3 ft. in length and is of a bright white color. It is absolutely smokeless and it is emphasized that the combustion is perfect, no soot or sediment being caused at any time.

The relation between the steam and the oil is perfectly balanced at all times and the regulation of the flame is closer than is possible with any other type of oil burning apparatus. In fact, tests have shown that the regulation is as close, if not closer, than with ordinary illuminating or natural gas. The slightest adjustment of the burner needle valve will result in an immediate regulation of the flame so that the device can be used in heating apparatus where ordinary gas has been formerly used.

The device is automatically supplied with oil and water and no adjustment is necessary to operate the apparatus. Among the applications which can be made of this burner in the industrial field are the heating of cars, baking, japanning and annealing ovens, forges and smelting furnaces, and it is also possible to use it for portable work, such as fire engines, automobiles and motor boats.

Another special feature claimed for the device, in addition to its close regulation and great efficiency, is its

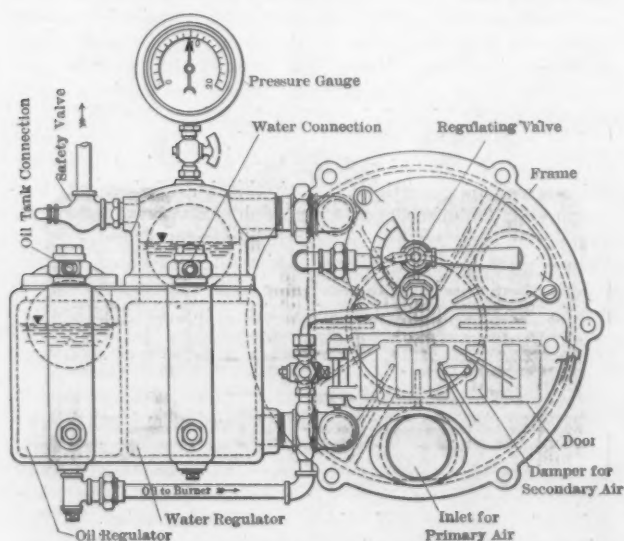
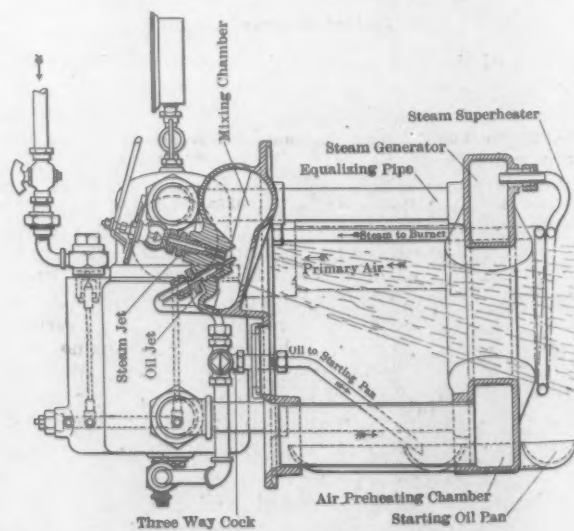


Fig. 2—Front and Side Elevations Showing the Arrangement of the Various Parts

pipe. The steam equalizing pipe connects the steam generator with the water regulator, as shown in Fig. 2. The steam, as it is generated, is carried through a superheating pipe to the burner which has a needle valve operated by a wooden lever handle to regulate the steam supply. The



safety. The pressure used in the steam generator is low and this pressure supplies the fuel to the burner by suction. In this way it is emphasized that it is impossible to flood a furnace equipped with this device and if the flame should become extinguished at any time from any cause,

the supply of oil will cease at once, thus rendering the accumulation of oil or oil vapors in the open air or in the furnace impossible.

At the present time only one device, the type A, which is the one illustrated, is on the market. The consumption of this device varies from 1-5 to 1½ gal. per hour.

Time Recording System

An Automatic Time-Keeper for Employees and for Cost Systems, Accumulating Electrically Elapsed or Productive Time

For use in connection with any condition of timekeeping, the Sohm Electric Signal & Recording Company, Ravenswood and Berteau avenues, Chicago, Ill., has brought out an elapsed time accumulator and recorder. The parts of the system are two in number, the accumulator and recorder and the registry station. Fig. 1 is a view of the accumulator and recorder, and Fig. 2 shows one of the employees' registry stations, while one of the

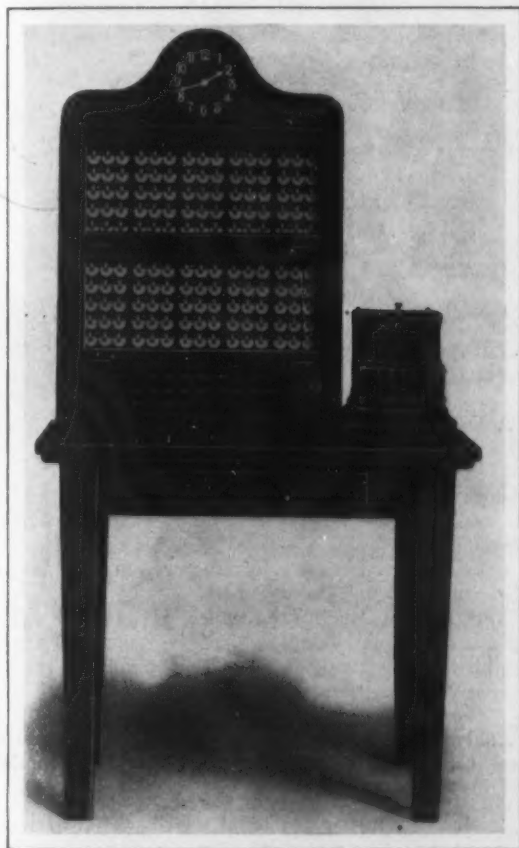


Fig. 1—The Elapsed Time Accumulator and Recorder Built by the Sohm Electric Signal & Recorder Company, Chicago, Ill.

accumulator sections having a capacity of 100 employees is illustrated in Fig. 3.

The accumulator and recorder shown in Fig. 1 is kept in the office of the timekeeper and is connected electrically with one or more employees' registry stations. The number of these stations and their location can be varied as widely as desired to meet the conditions existing in the plant. At the registry stations, one of which is illustrated in Fig. 2, there are two sets of numbered push buttons. One of these is the in-button, which when pressed for any number starts the accumulation of time for that one, and the other is the out-button, which stops the accumulating process when it is pressed. If the timekeeper desires to know the time of any employee, for example, No. 650, he inserts a plug in the opening at 650 in the accumulator, presses a master button on the recorder, and within 4 sec. a printed record is turned out which gives the number of the employee, the rate and the number of hours. This record can be printed in such a form as to be available for reference purposes and also in duplicate on the pay envelope if so desired. A rate sheet is furnished with the machine which gives the amounts for varying periods of

time for different rates. The mechanism used in the system is very simple and there is nothing which is apt to get out of order easily. All the different parts are interchangeable, so that new ones can be readily replaced. The capacity of the recording machine is practically un-

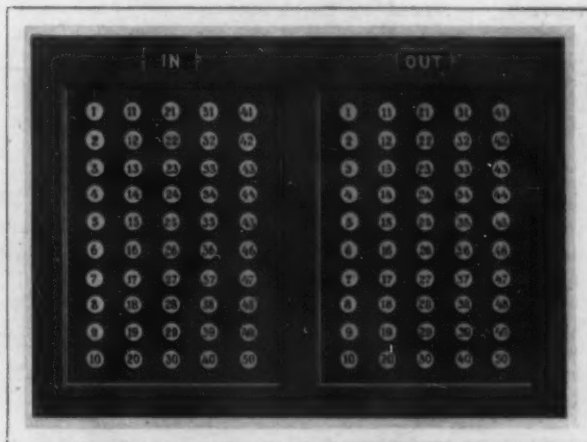


Fig. 2—The Employees' Registry Station

limited, and it will print 640,000 possible combinations, ranging from ¼ to 99⅞ hr. and the same rates of pay in cents.

It is pointed out that no interference is possible in employees registering. Any number of stations can be established in different parts of the same building or in widely separated buildings, all connected with the central accumulator. If all the buttons in all the stations should be pressed simultaneously, it is emphasized that all would register properly without interference. The recorder may be printing records and the accumulator adding time simultaneously with the registering of employees without any possibility of interference.

The accumulator, which is shown in Fig. 3, is manufactured in sections, each containing any number of individual employees in it. The mechanism required for each employee occupies 2 x 1½ in. and each of these individual units is independent of all the others and can be withdrawn from or inserted in the section without causing any disturbance. A section for 100 employees occupies a space measuring 18 x 34 in. and 8 in. deep, which is less than the average bookcase section. These sections may be added to from time to time until as many as are needed are secured. For larger factories and stores special cabinets, either fully or partially equipped, are built. A 2000-employee cabinet can be built and equipped for 1800, the extra equipment being added at any desired time by filling in the empty spaces with individual employees' units. The accumulator can be placed in any vacant space in the

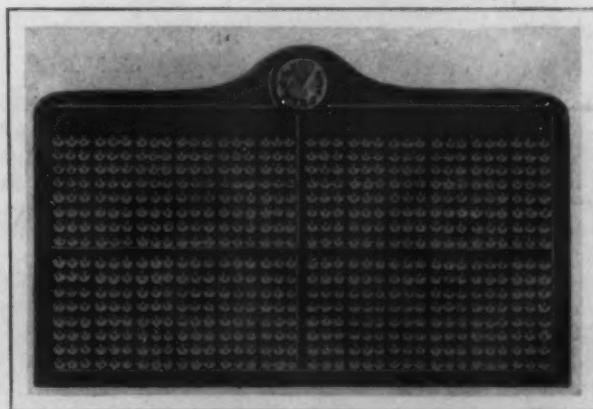


Fig. 3—An Accumulator Section for 100 Employees

office, or if the space is limited it can be placed in any other part of the building, the operator only needing to have at hand the transmitter and the recording machine. If desired the accumulators can be built to fit any special space which may be convenient or that may be designed for them.

In connection with cost keeping work, the accumulator and recorder will give an accurate classification of the time consumed on every job by each employee in all the departments of the factory. In this way it is possible to determine the actual elapsed productive time on each piece of work, the calculations being made automatically and the record secured by the accumulator. Thus any discrepancies can be discovered, and as a result lost time is eliminated.

Standard Methods of Sampling

Practice Sanctioned by Manufacturers in Check Analysis of Steel.

The Association of American Steel Manufacturers has just adopted a set of rules to be followed in obtaining samples for the check analysis of steel. This latest action of the association is in response to the need all manufacturers and many consumers have felt for uniform conditions which should govern both parties when steel is to be analyzed, especially when its acceptance or rejection depends upon check analyses. A booklet entitled "Standard Methods of Sampling for Check Analysis," containing the new rules is issued under the new classification of "Manufacturers' Standard Practice" which the association now uses for certain of its adopted rules, when they are not strictly of the nature of specifications. Copies will be furnished by the secretary, Jesse J. Shuman, care of Jones & Laughlin Steel Company, Pittsburgh. The text is as follows:

Introduction

It is a recognized fact that the different parts of a piece of steel are liable to vary in composition. This variation occurs principally between the center and the outside, and to a slighter extent is dependent upon the position of the piece in the ingot, and the size of the ingot.

Where a sufficient number of check analyses have been made from drillings properly taken at different points in the heat to represent it fairly, their average has been found to compare favorably with the ladle analysis, which is the analysis of a small test ingot taken at any time during the pouring of the heat.

From this it is evident:

1. That the ladle analysis is more representative of the composition than any single analysis of the finished material.
2. That drillings for check analysis, to be fairly representative, should be taken at a point intermediate between the outside and the center of the cross-section.
3. That a sufficient number of check analyses of different pieces should be made to afford a fair average to compare with the ladle analysis.

1. Points to Be Observed in the Sampling of Material for Check Analysis

- (a) Each heat in a lot shall be considered separately, and pieces for sampling shall be taken to represent the heat as fairly as possible.
- (b) Samples must be drillings or chips cut by some machine tool without the application of water, oil or other lubricant, and shall be free from scale, grease, dirt or other foreign substance. If samples are taken by drilling, the size of the drill shall be not less than $\frac{1}{8}$ in. nor more than $\frac{3}{4}$ in. in diameter.
- (c) Samples must be uniformly fine and each must be carefully mixed before analysis.
- (d) In referring samples to the manufacturer or other analysts for check analysis, a piece of the full-size section, when possible, should be submitted rather than cuttings, unless the latter are specially requested.
- (e) Where material has been subjected to heat treatment other than annealing or simple cooling, subsequent to its manufacture, it should be annealed before sampling.
- (f) Check analyses are not representative of the original material when its composition has been altered in any

way by some operation such as casehardening, overheating, etc.

2. Methods of Obtaining Samples for Check Analysis

Material has been divided into the following classes, depending upon the manner of sampling:

I. MATERIAL SUBJECT TO PHYSICAL REQUIREMENTS:

Samples for check analysis shall be taken from a test specimen. Where it is required to make additional check analyses, samples shall be taken as indicated under II.

II. MATERIAL NOT SUBJECT TO PHYSICAL REQUIREMENTS:

(a) *Special cast, rolled or forged, semi-finished or finished material of large size, such as ingots, blooms, billets, slabs, rounds, shapes, etc., subject to acceptance on check analysis.*

Samples shall be taken at any point midway between the outside and the center by drilling parallel to the axis.

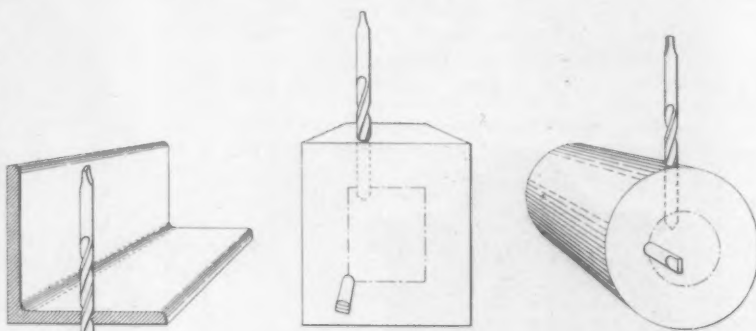


Fig. 1.

In cases where this method is not practicable, a piece may be drilled on the side, but drillings shall not be taken until they represent the portion midway between the outside and the center. See Fig. 1.

(b) *Small or thin material, such as plates, shapes, bars, etc., subject to acceptance on check analysis.*

Material for which the previous method is not applicable shall have samples for analysis taken entirely through the material at a point midway between the outside and the center, or by machining off the entire cross-section.

(c) *Commercial material subject to acceptance on ladle analysis.*

The methods described under II(a) and (b) shall apply, except that samples shall be taken at any point one-third of the distance from the outside to the center.

3. Methods of Analysis

Analyses shall be made by well-known accurate methods. Carbon shall be determined by the combustion method.

4. Rejection of Material on Check Analysis

Any rejection of material ordered to a specific chemical range shall be based on the following:

(a) The minimum number of samples to be taken from a heat before rejection by the purchaser shall be as follows:

Weight in Gross Tons.	Minimum Number of Samples.
5 or less	3
10 or less but over 5	4
15 or less but over 10	5
Over 15	6

In case the number of pieces in a heat is less than the number of samples given, one sample from each piece shall be considered sufficient.

(b) Separate determinations shall be made on each sample and the results averaged, unless they clearly indicate mixed grades.

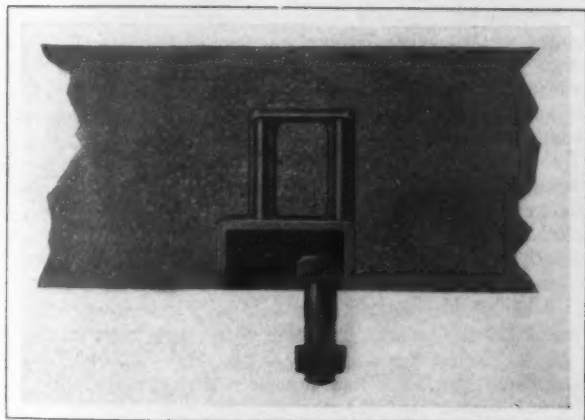
The Canton Mfg. Company, Canton, Ohio, reports a very good demand for its sheet metal products, including windows, sky lights, ventilators and cornices. In the first six months of this year it booked as much business as in the whole of 1911. Among work recently taken is an \$8000 order for metal windows for the Murphy Hotel, Richmond, Va., and a \$2300 order for windows for the Richmond Chamber of Commerce.

Shafting Hanger Support for Concrete Construction

For use in connection with concrete construction when it is desired to provide means for attaching pipes, machinery, shafting hangers, overhead tram rails or any other parts which must be attached to walls, ceilings or floors, Janney, Steinmetz & Co., Philadelphia, Pa., are selling the Dayton concrete insert. One of the special features claimed for the use of this insert is that it provides a certain flexibility of adjustment. In this way it is possible after the inserts have been set to shift the bolt centers several inches. It is explained that the old method of setting these inserts on a wooden template gave trouble on account of shifting and the exact centers which were desired and planned for would not be secured, it sometimes becoming necessary to rebores the shafting hangers and this caused inconvenience where special shapes had been designed for in cast iron for adjustment to the bolt sockets.

As will be noticed from the accompanying engraving the insert is adapted to receive the head of a bolt and provides for adjustment to compensate for slight errors in setting on forms. The insert is located on the inner face of the form whether for walls or floors and is firmly and quickly attached by two nails driven into the woodwork through the slotted lugs. If very accurate location is desired a hole may be bored through the form work and the insert bolted in place. When the form is removed if necessary this bolt can be adjusted. After the concrete is poured the insert is held firmly in place.

It is claimed for the insert that it is so firmly supported in the concrete that the bolt itself will break before the concrete is loosened. In installing these inserts it is



The Dayton Concrete Insert for Fastening Machinery and Shafting in Concrete Buildings Sold by Janney, Steinmetz & Co., Philadelphia, Pa.

recommended that wherever possible reinforcing bars should be located under the flange or between the two supporting lugs. Several types of inserts are made for hanging various heavy weights from factory ceilings, among which are the type illustrated for bolting machinery to the floor, for hanging piping, electric lamps or any other weights where adjustment is not desired and also for hanging shafting or any other weights where one or more bolts are to be used in the same straight line or where a large amount of adjustment is required. With the exception of the last type of insert, several sizes of bolts ranging from $\frac{1}{4}$ to 1 in. in diameter may be used with the same insert. In the type of insert requiring a large amount of adjustment only $\frac{3}{4}$ -in. bolts can be used. This insert is made in lengths of 18, 24 and 36 in.

The White Iron Works Company, Cleveland, Ohio, recently incorporated with a capital stock of \$15,000, was formed to take over the business of the Eureka Iron Works Company, 431 Arcade. The management will not be changed, C. S. White continuing to conduct the business. The company manufactures structural and ornamental iron. It recently established a manufacturing plant at 1967 East Fifty-fifth street.

The Chattanooga Iron & Coal Company, Chattanooga, Tenn., blew in its blast furnace September 9.

Large Double Crank Press

Recently there has been designed and built by the Niagara Machine & Tool Works, 639 Northland avenue, Buffalo, N. Y., a large double crank press which is adapted for a wide range of work such as heavy blanking, shearing, forming, embossing and cold drawing operations. Aside

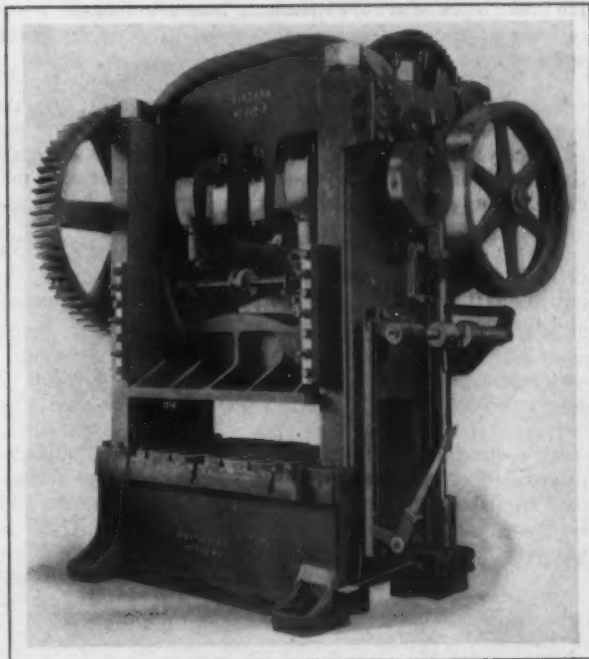


Fig. 1—Front View of a New Large Double Crank Press Built by the Niagara Machine & Tool Works, Buffalo, N. Y.

from the wide range of work which it is possible for this press to handle, the machine is interesting on account of the minimum amount of floor space occupied. This feature has been made possible by locating the drive overhead and eliminating the outboard bearings. Front and rear views of the press are given in Figs. 1 and 2 respectively.

The general construction of this machine is the same as the others built by this company, the bed, housings and arch being held together by four $5\frac{1}{2}$ -in. steel tie rods which are shrunk in place. The slide and gibs have the same conveniences for adjustment as all the large presses built by this company.

The equipment of the press includes the builder's combination friction clutch and brake. The clutch is of the



Fig. 2—Rear View Showing the Automatic Friction Clutch

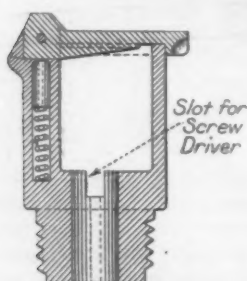
multiple disk type, and the friction surfaces are lined with end grain hardwood blocks. It is entirely incased and all projecting rotating parts which might endanger the operator when oiling the clutch have been eliminated. Four sets of steel toggles and links operate the clutch and the brake which works in unison with the clutch consists of two levers which are actuated by a pair of toggles. A special feature of this construction is that the pressure on the brake block is always equalized, thus avoiding the transmitting of the pressure of the brake arms to the shaft bearings.

If desired the clutch can be started by a foot treadle which actuates an automatic device. This will stop the press when the slide reaches the highest position and can be quickly thrown out of action. This makes the press a hand tool again, the starting and stopping of the machine at any part of the stroke being controlled by a hand lever.

To guard against breakage in case the press is accidentally overloaded there is a safety coupling on the pinion shaft. The press measures 72 in. between housings and the weight is 60,000 lb.

An Improved Oil Cup

A somewhat novel type of oil cup which can be placed in position or removed from the machine without the use of a wrench is being manufactured by the Wahlstrom Tool Company, 346 Carroll street, Brooklyn, N. Y. This cup possesses as its especially distinctive feature a screw driver



A New and Improved Oil Cup Made by the Wahlstrom Tool Company, Brooklyn, N. Y.

slot at the bottom as is clearly shown in the accompanying engraving. In putting the cup in place on the machine, or removing it, it is placed just above the hole and a screw driver inserted into the slot, after which it is screwed into position the same as an ordinary machine screw. If for any reason the oil channels should become clogged it is simply necessary to insert a wire through the hole in the bottom of the cup and remove the obstruction. The cover of the cup is spring actuated so that it is not necessary to keep it open with one hand while oiling with the other. In places where there is not much room it is possible to open the cover readily with the spout of the oil can and close it just as easily by giving the cover a slight pull. The spring does not affect the position of the cover so long as it is entirely raised, but as soon as it is moved the spring causes it to close rapidly. This cup is made in all of the ordinary sizes. The mechanism of the cup is dustproof, and dust collecting on the outside of the oil cup, it is emphasized, cannot be carried into the bearings and there are also no loose parts inside to interfere with the free passage of the lubricant.

The Manufacture of High Percentage Ferrosilicon in the Electric Furnace

A recent issue of *Revue de Metallurgie* contains a long paper by Doctors Pick and Conrad on the manufacture of ferrosilicon. It is divided into six chapters. The first and second deal with theoretical considerations and the general properties of the alloys. The next takes up in detail the principal processes by which ferrosilicon is made, and the patents covering its manufacture. Chapter 4 is most practical. It gives a design for a small plant of 2000 kw., considers the raw materials, and gives important drawings and details of furnaces in active operation. The next chapter is also very good, where the theoretical and practical yields from actual charges are carefully worked out. Full details are given of the materials and weights used, and the furnace is also described. The influence of various impurities in the charge on the finished alloy is briefly taken up. The paper closes with some details of costs of operation at French and Austrian plants.

G. B. W.

American Manufacturers' Export Association

The American Manufacturers' Export Association concluded its third annual meeting in New York City last week with a banquet at the Hotel Astor on Saturday evening. At the morning session on that day reports from the various committees were read and officers elected as follows: President, Congressman William C. Redfield, president American Blower Company, Detroit; first vice-president, M. de Moreira, of John Boyle, Inc., New York; second vice-president, O. W. Smith, of Parke, Davis & Co., New York; third vice-president, W. J. Marsden, Yale & Towne Mfg. Company, New York; treasurer, H. L. Gemberling, Sherwin-Williams Company, Newark, N. J. Directors, W. N. Dickinson, Otis Elevator Company, New York; A. W. Ransome, Ransome Concrete Machinery Company, Dunellen, N. J.; W. T. Clark, Flintkote Mfg. Company, New York; José Menendez, H. B. Claflin Company, New York; Alfred J. Jupp, Lunkenheimer Company, Cincinnati, and W. S. Gavan, E. I. Du Pont de Nemours Powder Company, Wilmington, Del.

Resolutions were adopted praising the consular service and the system employed by the Department of State in the last seven years in selecting consular officers by examination, which has resulted in retaining trained and efficient men without regard to their political affiliations. The exporters believe this has resulted in marked improvement in the service.

At the banquet President Redfield acted as toastmaster. The speakers made vigorous pleas for the full extension of our trade into the Latin American countries with the opening of the Panama Canal. They asserted that this country was the laughing stock of all Europe because it has been spending \$400,000,000 on a great canal that will be used mostly by foreign vessels.

President Redfield warned his hearers that an era of domestic prosperity was no excuse for forgetting the foreign markets. While prices were advancing and better sales were being made and the home plants being kept running full to supply the demand at home, he thought just as much attention proportionately should be given to the industry in other lands. He said the coming year would not be as easy for the exporter as the last unless he kept just as busy in the markets abroad. He thought the time was now at hand for the most energetic work in South America and all directions leading from the Panama Canal.

Charles H. Sherrill, late Minister to Argentina, made a stirring address, in which he said:

Last year 75 per cent. of our trade was carried in English and German bottoms. Now suppose that a war should break out between England and Germany next Saturday night. Would any man in this room dare to ship his goods in either an English or a German bottom, and doesn't every man in this room know that if the English and German merchant marine was thus, by act of war, eliminated from carrying our foreign goods the merchant fleet of the rest of the world is not sufficient to replace those vessels? The result would be that our foreign trade, for which you gentlemen have been working, and which is increasing with gratifying rapidity, will receive a shock unparalleled in the annals of our trade. Your goods would remain on our docks, and the effect of this sudden check upon our manufactures would be felt, not only by the manufacturer, but in the furthest corner of our country, and in the most remote farmhouse. This presents to you a danger which can only be remedied by the taking of prompt measures to so assist our merchant marine that it can compete with those of other nations.

Addresses were made by a number of others, including Congressman William Sulzer and Count de Almeida of Brazil.

The American Railway Association reports a net shortage September 12 of 8620 cars. This is the first time since 1910 of a shortage being reported. A year ago there was a surplus of 64,283 cars. The traffic movement is not yet at its height. The present scarcity is due mostly to the very heavy grain crop, but the failure of the railroads to buy cars as needed also figures largely.

The Lebanon Valley Iron & Steel Company, Lebanon, Pa., will build a new bolt and nut factory, 55 x 200 ft., and make an addition of 50 ft. to its present plant. A 12-in. rolling mill is to be installed. The capacity of the existing plant is to be doubled by the proposed additions.

Allied Foundrymen's Meetings in Buffalo

Tuesday's Sessions of the Annual Conventions of Iron, Steel and Brass Foundrymen—The Contemporaneous Exhibition of Foundry Equipment

The annual gathering of foundrymen bids fair to be as profitable and enjoyable as in times past. That the total registration will be large is indicated by the crowded condition of the hotels even on Tuesday morning. This will provide for the valuable feature of social intercourse and the informal exchange of information. That the educational side will be well taken care of is promised by the numerous and varied papers scheduled and the comprehensive and elaborate exhibition of foundry machinery and apparatus. There is one marked difference between this and the meetings sixteen months ago in Pittsburgh. There the exhibition and the meetings were close together, occupying the same or adjoining buildings. In Buffalo, where the meetings are held this year, the American Foundrymen's Association holds forth at the Hotel Statler, the American Institute of Metals is meeting at the Iroquois Hotel, the Associated Foundry Foremen have headquarters at the Broezel House and the exhibition of the Foundry & Machine Exhibition Company is housed in the enlarged Broadway Arsenal some distance from the Statler. The reading and discussing of papers will not this year receive the untimely thunderous applause of some heavy jolt ramming machine irreverently put into action. What effect the distributed centers of activity are going to have on the attendance at meetings or at the exhibition cannot be foretold at this writing, but the meetings were well patronized Tuesday and yet there was considerable bustle at the exhibition hall.

Tuesday's impressions may be briefly put as follows: Papers marking the commercial as well as the technical progress in the foundry industry have been gathered; foundry equipment at the exhibit is displayed, if anything, more attractively than last year and there is less heavy machinery in evidence—incidentally the effect of the so-called miniature blast furnace and the general setting of the Rogers-Brown exhibit mentioned last week, occupying a large part of the end of the building facing the visitor on entrance, is all-absorbing—the Buffalo committees in charge of convention arrangements have provided well for entertainment; the meetings in 1913 are likely to be held in Chicago, though Milwaukee is making a bid.

A Joint Session at the Opening

In the first session, opened about 10 a. m., there was joint participation by the American Foundrymen's Association and the American Institute of Metals. Major Joseph T. Speer, Pittsburgh Valve, Foundry & Construction Company, president of the American Foundrymen's Association, presided. Addresses of welcome were made by Mayor Fuhrmann of Buffalo, by the president of the Buffalo Chamber of Commerce, by Frank W. Tracy of the Buffalo Convention Bureau, and by Henry D. Miles, Buffalo Foundry & Machine Company, chairman of the general committee of the convention. A response was made by A. E. Howell, Phillips & Buttorff Mfg. Company, Nashville, Tenn., one of the vice-presidents of the association. He congratulated the association on being made up of producers of payrolls and not of those who are mere recipients of interest on investments. Mr. Miles paid a tribute to the members of the convention committee, particularly George V. Horgan, chairman of the reception committee, and Frank B. Baird, chairman of the entertainment committee.

Proposed Changes in By-Laws

The joint session was announced adjourned and Major Speer presented his presidential address for the American Foundrymen's Association. He recommended that the constitution be amended or changed so that the officers in the future would not encounter the trouble experienced this year in arranging the time for the meeting of the convention. He advised also that ways and means be devised for the advancement of the work which has been done in the past by the association. "As we are all aware," he said,

"this cannot be done without the support of the industry. Our membership is about 700 and I have no doubt could be increased threefold by concentrated effort on our part. I would therefore suggest that a committee be appointed at this session to formulate the necessary changes in the by-laws and make report to this convention at the earliest possible moment."

As a result of the suggestions, it was voted, on motion of W. H. McFadden, honorary member, Pittsburgh, seconded by H. M. Lane, that a committee of seven be appointed to report to the meeting on the desired revision of the constitution. R. A. Bull, Commonwealth Steel Company, Granite City, Ill.; W. A. Bole, Westinghouse Machine Company; A. E. Howell, Nashville, Tenn.; J. S. Seaman, Pittsburgh; H. D. Miles, Buffalo; F. B. Farnsworth, New Haven, Conn., and T. W. Sheriff, Sheriff's Mfg. Company, Milwaukee, Wis., were accordingly named. It was voted also that the executive committee of the association report later in the meeting on the matter of ways and means.

Report of Secretary-Treasurer

Dr. Richard Moldenke then presented his annual report as secretary-treasurer as follows:

We are just recovering from one of the worst periods of depression the foundry industry has passed through in many a year, and hence it is little to be wondered at that our association has suffered correspondingly. Fully 15 per cent. of the members have either resigned or had to be taken from the rolls this year, and it may be of interest to state that a canvass of the industry just concluded has revealed a surprising number of changes brought about by financial stress.

A vigorous campaign for new members has, however, served to recover some of the lost ground, so that to-day we have 626 members, with more coming in by every mail—showing better than in any other way the resumption of business activity and business optimism. One point, however, needs mention. By far the greater loss in our membership was due to the withdrawal of the supply houses. Various reasons were given for this, when given at all. The principal one was that the exhibition was giving them all the publicity they could hope for and membership was not needed. Now, in an association like ours, composed as it is of men who are striving to advance their industry, no matter what sacrifices in capital and energy it may bring upon them as individuals, the presence of the sellers of supplies is as a rule an unwelcome one, and indeed many associations expressly keep them out of membership. With us, however, it is recognized that the man who sells us the supplies we need is apt to know very much more about them than we do, and hence we want him with us to talk things over, to see where improvements can be made, and to arrive at an understanding which will eliminate unnecessary loss of money and time by studying our conditions better.

STANDARDIZING FOUNDRY SUPPLIES

The time is rapidly coming when we as an association will go about standardizing our supplies, and indeed to-day there is a call for a number of such standards. The first will come before you at this convention—namely, the preparation of standard specifications for core binders. We now know sufficient on this subject to enable us to lay down definite requirements for this class of materials, and a committee to do so is recommended for appointment at this meeting. Now, unless the manufacturers of core binders are members of the association, to which membership they are heartily welcome, while to part membership of the committee they are entitled, they will have nothing to complain about if the eventual specifications are in their judgment drawn too tight. They will have neglected their chance to be considered.

It finally boils down to the plain statement that unless

(Continued on page 747.)

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The Foreign Iron and Steel Boom

Our German and British market letters of recent weeks have given indications that the remarkable prosperity of the iron and steel trades in both countries is likely to run on for months. European iron and steel markets, which are an index of world-wide conditions, have a way of persisting in a given state. There will be several years of slack or moderate business, succeeded by a period of expansion, coming to high tide prosperity. There are none of the rapid transitions from good times to bad, or the reverse, which have made the United States a puzzle to the steel masters of other countries—not to say to its own. It is this comparative stability of German and British markets in a given condition, with only gradual changes, because of the distribution of so much of their business throughout the world, that gives confidence in the prolongation of the present prosperity.

The London Iron and Coal Trades Review says of the remarkable movement in Cleveland pig iron which has now been in progress for several weeks, that it continues without interruption and that makers confidently anticipate that the exceptionally high price of 70 shillings will be reached for No. 3 iron. Speculators in Cleveland iron at the same time have predicted that 80 shillings will be reached in the warrant market, though this week there has been some reaction. There is no dissent in the iron trade in Great Britain from the view that a boom is on and that no one can now forecast the end of it. Armament firms have booked business that will last over two years. Clyde shipyards made a new August record last month with an output of 22 vessels of 87,500 tons, and the 417,850 tons built in the eight months ending with August is more than in any corresponding period with the exception of 1907. This remarkable output of shipyards follows an unusual year, the total for 1911 being the highest ever recorded. The expectation is that 1912 will make even a greater record. The extent of the prosperity of the British iron and steel trades is the more noteworthy in view of all that country went through earlier in the year, beginning with the general coal strike and including the railroad strike and the dock strike, and more recently the feeling of depression due to the very disastrous crop season. It is an indication of the soundness of the present prosperity that it has increased in spite of such apparently serious setbacks. Some of the business in steel is in fact in partial compensation for the interruptions earlier in the year.

Pig iron production has been increasing in Great Britain and today, with practically all the available blast furnace capacity active, the buying movement continues very strong. There has been a demand for semi-finished steel which neither Germany nor the United States has fully met. It would be unfortunate if at such a juncture British buyers of American billets and sheet bars had any reason to complain of failure to carry out contracts. The policy of the United States Steel Corporation, in setting aside a definite amount of product for the foreign trade and refusing to trench upon it even under the most urgent demand at home, has been very generally commended in this country as contributing to the maintenance and extension of our export trade in steel. Our British correspondent, referring last week to the possibility that some British buyers of American steel may be disappointed through failure of deliveries, intimates

that such an outcome would be in marked contrast with the scrupulous fairness with which the German Stahlwerks Verband treats its customers. There is, of course, no such parallel in the German trade to the sudden changes of front in this market which recently may have led American steel makers to regret export sales; but there will be only one opinion as to the necessity for rigidly carrying out contracts, if our independent steel manufacturers are to succeed in getting and holding their share of the foreign trade.

While good times in the German iron and steel trades have been longer under way than in England and prices have been for months at high levels, latest reports indicate no subsidence of the German boom. Pig iron production, which is a good gauge, is still growing, the August output establishing a new record at 1,487,448 metric tons, or at the rate of nearly 18,000,000 tons a year, whereas the production in 1911, which was the highest ever known, was 15,535,000 tons.

These unparalleled conditions of large demand at good prices which are so marked in Great Britain and Germany have more interest than ever for the American steel trade now that the world demand for steel is a much more important factor than ever in our own prosperity. The day may yet come when our foreign trade in steel, which has been built up with such sustained and intelligent effort, will serve to compensate in an important way for temporarily untoward conditions at home.

Unskilled Labor or None

A skilled workman seldom leaves the office where he has applied for employment these days without receiving the offer of work. He is absorbed into the shop establishment greedily. Labor bureaus throughout the country are unanimous in stating that even men of limited experience are very scarce, and that unskilled labor is becoming steadily more difficult to get. The manufacturer faces the imperative need of more help. In recent years contented only with the best, he must now take what he can get. His task is to train the man who has had little experience to specialized effort, the skill for which needs no great amount of time to acquire.

The sooner this effort becomes general, the greater will be the ability of the country to meet the tremendous demand for its products, which is now becoming sharply felt. Owners cannot afford to wait. Superintendents and foremen should use every effort in instructing new employees. This department of management becomes highly important in times like these. Many foremen are indifferent instructors; the best should be chosen for the work. In some works specialists devote much of their time to this purpose, constantly striving to increase the skill of the men. The task may accompany that of improving manufacturing methods generally; in increasing machine as well as human production. At present the man, not the machine, is the weak element. The substitution of new machinery for old helps enormously. But new labor must be made as well, if it cannot be obtained from countries where the supply is greater than here.

The alien contract labor law is a serious obstacle to the expansion of our industries at this time. As our immigration laws read today, the unskilled alien laborer with a certain small amount of money in his

pocket is welcomed, with no questions asked as to the reasons for his coming, while the skilled workman may be greeted with the suspicion that he has been induced by an American manufacturer to accept employment. If it is proved that the suspicion is based upon fact, the employer is subject to arrest and punishment as a criminal. The time appears to have come when this law could well be repealed. It is not needed to protect the workman for no man now is without work unless he prefers idleness. If the way were open, skilled European workmen could be brought to this country under engagement, and manufacturers who are cramped in their efforts to meet the demands of their customers could enlarge their operations. We are admitting peasants who have to undergo years of training to become competent workmen, whereas we should be bringing in men of aptitude in mechanical pursuits. Such men will hardly give up certain employment in their own countries on the mere chance of finding an equally remunerative position here. They need the inducement of a contract with a reputable employer on this side. A scarcity of workmen operates, directly or indirectly, to the detriment of every one. The effect of the alien contract labor law is to compel the United States to train its immigrants, instead of encouraging the immigration of higher grade workmen.

Judging Credits by Shop Management

Banking interests and investors have become well acquainted with the advantages which come with modern industrial business management, with its orderly, exact cost accounting and money-saving efficiency systems. More and more these conditions are being watched in the establishment of credits. The industry which is managed scientifically, as the term is used in business, has a relatively greater borrowing capacity than one which has failed to keep abreast of the times, even though the latter may be well established by years of successful operations, and the former a new comer in the field. Those who come into intimate contact with manufacturing works receive frequent inquiries which indicate plainly that watch is kept not only on the young industry but on the old, in the fear that the latter may be retarding its progress to its own loss and to the gain of its more progressive competitors. Old names have great value, but the value can insidiously be reduced because of failure to take advantage of later opportunities. The evolution of a branch of industry may be much more rapid than some of those connected with it can realize. And with these changes come corresponding revisions in credits.

Unutilized Sanitation

An expert's investigation of a large modern works revealed a rather general failure to utilize the provisions for maintaining sanitary conditions. The case is not unusual. Owners spend a good deal of money in their efforts to give their employees healthful surroundings. Ventilation is provided and remains unused, or is not wisely used. The illumination from spacious windows is reduced by failure to keep the glass clean, and the same kind of neglect is found in other elements which should be working toward health and comfort. The busy manager must intrust such details to others and the responsibility is passed along, with neglect as

the natural consequence. In common with other shop features which do not directly bear on production, sanitation is more or less lost sight of.

The cure lies in the placing of responsibility with some one person. That one should see to it that correct ventilation is secured, that rooms are maintained at a normal temperature, that windows are clean, and so on. In the winter months dirty windows compel the earlier use of artificial light, which is expensive and at the same time more trying to the eyes of operatives. An intelligent foreman or workman can carry on this inspection with no serious loss of time, making reports of his observations and suggestions for improvements. Unclean or otherwise unsanitary conditions are not hard to find if they are watched for. The inspection should include observations for noisiness which may be a clue to waste power, and unpleasant, nerve-racking sounds are usually unnecessary and not difficult to remove. In the plant already referred to a few trips of inspection caused a great improvement, bringing sanitation to the point which the owners aimed to reach when they planned the buildings.

American Iron and Steel Institute Meeting at Pittsburgh

The American Iron and Steel Institute, James T. McCleary, secretary, sends out a preliminary announcement of the third general meeting of the institute which will be held at Pittsburgh Friday and Saturday, October 25 and 26. There will be forenoon, afternoon and evening sessions on Friday, the papers and discussions relating respectively to business topics, technical and works subjects and welfare work. A banquet will be given Friday evening at which the members will be guests of the institute. Saturday will be devoted to seeing Pittsburgh and vicinity. Among the papers and addresses in preparation for the meeting are the following:

- The Use of Mayari Iron in Foundry Mixtures, by Quincy Bent, assistant to the president Maryland Steel Company.
- The Manufacture of Ordnance at the Bethlehem Steel Works, by E. G. Grace, vice president and general manager Bethlehem Steel Company.
- Electric Power Production and Distribution in Steel Works, by Stewart C. Coey, engineer, Youngstown Sheet & Tube Company. Discussion led by B. R. Shover, Brier Hill Steel Company.
- Coal Mine Ventilation in the Connellsville Coke Region, by Austin King, chief mine inspector H. C. Frick Coke Company. Discussion led by Wilson A. Luce, General Manager Ellsworth Collieries Company.
- The Technical Training of Salesmen, by James Camp, Carnegie Steel Company. Discussion led by E. P. Thomas, president United States Steel Products Company.
- Microscopic Analysis of Steel Sheets, by C. Arthur White, American Sheet & Tin Plate Company.
- Recent Developments in the Preparation of Iron Ores, by J. W. H. Hamilton, mining engineer.
- The Buyer from the Manufacturer's Standpoint, by John L. Haines, assistant to the vice president Jones & Laughlin Steel Company.

One of the interesting features expected at the banquet is a moving picture exhibition, showing the processes of iron production "from the ground up" recently prepared by Rogers, Brown & Co., Buffalo.

An Advance in Chain.—Effective September 23, another advance in the price of chain was announced by leading makers, the new schedule on straight link proof coil chain in cask lots, f. o. b. Pittsburgh, being as follows:

3/16 in.	7.35c
1/4 in.	4.80c
5/16 in.	3.80c
3/8 in.	3.25c
7/16 in.	3.05c
1/2 and 9/16 in.	2.85c
5/8 and 11/16 in.	2.75c
3/4 and 13/16 in.	2.65c
7/8 and 15/16 in.	2.55c
1 in. to 1 1/4 in. inclusive.	2.45c

A British Maker Bids Lowest for Navy Projectiles

Bids were opened September 19 at Washington by the Navy Department for 2000 14-in. and 3500 12-in. armor piercing projectiles, aggregating in value about \$2,000,000. It was found that the Hadfield's Steel Foundry Company, Ltd., Sheffield, England, named the lowest price on both lots. Its bid was \$395 each for the 14-in. and \$187 for the 12-in. The Washington Steel & Ordnance Company, Washington, D. C., bid \$490 for the 14-in. and \$277 for the 12-in.; the Crucible Steel Company of America, \$500 for the 14-in. and \$274.75 for the 12-in.; the Bethlehem Steel Company, \$500 for the 14-in. and \$279.40 for the 12-in.; the Midvale Steel Company, \$526 for the 14-in. and \$272 for the 12-in. The American makers, it is reported, claimed that even with the high bids submitted they expected no profit on the contract, asserting that they merely desired to clear expenses and keep their plants in a good state of preparation so that in time of war they could fill Government orders. It is stated that the general policy of the Navy Department is that where a foreign article is superior to the American the contract goes abroad, but if the difference is entirely one of price it will stay in America. The Government, of course, pays no duty on anything purchased abroad.

Bids were opened on the same day for a large number of target projectiles and for 6, 7 and 8-in. armor piercing projectiles, but on these it was found that American manufacturers were the only contestants.

Cresson-Morris Consolidation

Formal announcement has been made of the consolidation of the plants and business of the George V. Cresson Company and the Morris Engineering Company, both of Philadelphia, Pa., the new organization to be known as the Cresson-Morris Company. Both of the merged companies have long been known for the excellence of their respective products, and it is predicted that their combined facilities will insure even better service and a wider field of usefulness. Sugar machinery has been the principal specialty of the Morris Engineering Company, the machinery of which has been transferred to the Cresson plant at Eighteenth street and Allegheny avenue, Philadelphia, a still further extension to which is probable.

The combined companies will manufacture the transmission machinery for which the Cresson Company has long been famous, comprising rope transmission, machine molded iron and steel gears, and cut and miter gearing, together with Buchanan rock crushers, concentrating machinery and sugar making machinery, including Weston centrifugals, vacuum pans, multiple effects, crystallizers and in addition special and chemical machinery. In all departments to which the old companies gave their attention their engineers and executive heads have had wide experience. A great many of their products have gone to the manufacturing centers of Europe and other foreign countries.

The officers of the Morris-Cresson Company are as follows: P. H. Morris, president; A. S. Morris, vice-president; Gouverneur Cadwalader, secretary and treasurer; Henry G. Morris, consulting engineer; Joseph M. Hewlett, office manager, and Charles H. Moyer, New York representative. Mr. Moyer, who will continue in the management of the office at 90 West street, New York, where he long represented the George V. Cresson Company, has been with the Cresson Company since boyhood. He has an especially wide acquaintance among engineers and the machinery trade in general.

The Spicer Mfg. Company has let the contract for the erection of a new building on its property at South Plainfield, N. J., to be used as a die department in connection with its drop forging department. This building will be 40 x 100 ft., one story, of concrete steel construction. The power plant and other equipment have been purchased. This new addition has been made necessary by the large increase in the sale of Spicer universal joints for pleasure automobiles, commercial vehicles, and motor boats. The company has also arranged for an additional lot of equipment in the forging department, consisting of six drop hammers and several trimming presses.

Cheaper Aluminum in Prospect

The Engineering and Mining Journal of September 21 gives a description of the Electric Smelting & Aluminum Company's plant at Sewaren, N. J., which is using a process developed by Alfred H. Cowles and the late Adolf Kayser. This process permits the use of cheap clays to produce a substitute for bauxite, and it is claimed that with the utilization of by-products the cost of aluminum production will be cheapened by 4 or 5 cents per lb. Clay and salt are treated with steam to produce hydrochloric acid and sodium silico-aluminate. This is then broken down by lime into calcium silicate and sodium aluminate, from which cement, soda and aluminum are made.

The same paper says editorially: "The aluminum industry is just now of especial interest, not only because of the conviction that it is a metal that is destined to grow even more rapidly in industrial importance, but also because of the serious technical developments that are taking place in it. . . . Chief among these developments are the organization of the Southern Aluminum Company, to establish competition in the American manufacture of aluminum, the introduction of the Serpek process, and the efforts to put the Cowles process on a commercial basis. The Serpek process consists in treating purified bauxite in the electric furnace with air and coke, forming aluminum nitride, and then treating this product with caustic soda, which forms sodium aluminate and ammonia. The former is used for aluminum production; the latter to produce ammonium sulphate."

Canton Metal Ceiling Company's New Plant

The Canton Metal Ceiling Company, Canton, Ohio, has in operation its fine new plant for the manufacture of a general sheet metal line which includes ceilings as a principal product and siding, conductor pipe, eaves troughs and fittings. The company will also make metal tile and shingles. New designs of ceilings, tile and shingles are being brought out. The company occupies a plant 50 x 400 ft. In addition there is a storehouse 40 x 40 ft., with an office building. The plant is of brick and concrete construction and as nearly fireproof as possible. It is under the management of C. A. Weirich, who is also secretary and treasurer. Mr. Weirich is well known in the sheet metal trade, having for a long time been manager, secretary and treasurer of the Kanneberg Roofing & Ceiling Company, Canton. Harry P. Renkert, formerly president of the Kanneberg Company, is president of the new company.

A blast furnace belonging to the Nikopol-Mariupol Mining & Metallurgical Company, at Nikopol, South Russia, is being equipped with a blast furnace distributor by Arthur G. McKee, engineer, Rockefeller Building, Cleveland, Ohio. Mr. McKee's contract also includes the entire reconstruction of the furnace top. The greater part of the equipment needed for the work is being shipped to Russia from this country. The order for the distributor was placed by E. R. Lax & Co., Hughesovka, South Russia. The distributor is said to be the first one to be installed in Continental Europe. Mr. McKee is figuring on distributors for several other Russian companies.

The Bethlehem Steel Company has just closed a contract with the Blair Engineering Company, 17 Battery place, New York, to equip the six open hearth furnaces now under construction at the Saucon plant with Blair ports. These furnaces will use coke oven gas as fuel—a new departure in open hearth practice in this country. The Bethlehem Steel Company now has all ten furnaces at the Saucon plant equipped with Blair ports, and three in the Lehigh plant. The remaining furnaces at the latter plant are being equipped as rapidly as they go out for repairs.

A large number of officials of the United States Steel Corporation will attend the launching of the freight boat James A. Farrell, named in honor of the president of the corporation, at the Lorain yards of the American Shipbuilding Company, September 28. Among those who are expected to be at the launching are President Farrell and all the heads of the subsidiary companies of the Steel Corporation.

Crucible Steel Company's Dividend Policy

Chairman Herbert DuPuy, of the Crucible Steel Company of America, in a statement outlining the company's dividend policy, says that several million dollars are being spent to make improvements and extensions, and until all of these improvements, including those in contemplation, are paid for, the outstanding \$2,100,000 scrip redeemed and finances strengthened to an invulnerable point, the management would deem it unwise to even consider any further payments upon back dividends on preferred shares. He says: "Let it, therefore, be clearly known that the present management does not contemplate the payment of any dividends beyond the regular 7 per cent. per annum upon the preferred shares, for the above reasons, for a long time. All earnings above the present 7 per cent. must be applied toward strengthening the company's plants and financial position."

Wage Advance at South Bethlehem.—The Bethlehem Steel Company has raised the wages of such of the employees at its South Bethlehem, Pa., works as have been receiving 13½ cents an hour to 14½ cents an hour, dating from September 16. About 3000 men are benefited.

The United Steel Company, Canton, Ohio, is completing some important additions to its works. These comprise 12 new gas producers, doubling the size of the gas producer plant; a new steel building for a storehouse; an extension of the blooming mill building, 40 x 200 ft., with overhead cranes; another 12 x 12-in. bloom shear, with necessary transfer tables, feed tables, etc. The company is also installing a Mackintosh-Hemphill engine in a new engine house, with a 50-ton crane for it.

The Ralston Steel Car Company, Columbus, Ohio, has recently installed some new equipment including a 450-hp. gas engine of the C. & G. Cooper type, direct connected to Bury air compressor, and a 225-hp. gas engine bought from the Elyria Gas Power Company, Elyria, Ohio, and direct connected to a 220-volt d.c. Lincoln generator. Because of a serious shortage in labor its output of cars is about 25 per day, while it should be turning out 35 to 40 cars.

A. D. Smith, superintendent of the Canfield Oil Company, will read a paper October 1 before the mechanical section of the Engineers' Society of Western Pennsylvania entitled "Notes on Lubrication." At the regular monthly meeting of the society to be held October 15, F. G. Gasche, mechanical engineer of the Illinois Steel Company, will read a paper on "Theory of Steam Accumulators and Regenerative Processes."

Port Henry furnace, of the Northern Iron Company, Port Henry, N. Y., will be blown in about October 1. This plant has recently undergone extensive repairs. A new cast house, stack, and downcomers have been built, boilers installed and other modern facilities added. The capacity of the furnace has been increased about 1000 tons a month.

William H. Ridgway, of Craig Ridgway & Son Company, Coatesville, Pa., whose picturesque style has been well impressed upon readers of the literature of his firm, has written for general circulation a booklet entitled, "How They Got There." In it he comments in an unusual vein on the success of numerous representatives of "big business."

In addition to the two 60-ton open hearth furnaces to be built at the Clairton works of the Carnegie Steel Company at Clairton, Pa., an emergency hospital is to be erected, which will be under the charge of competent physicians and nurses engaged by the company.

The New York Shipbuilding Company, Camden, N. J., on September 21 launched the steel collier *Middlesex*, which it is building for the Coastwise Transportation Company, Boston, Mass. The vessel will be used in the coal carrying trade, and will have a cargo capacity of 7250 tons.

The Iron and Metal Markets

Advance in Steel Making Pig Iron A Sharp Turn in the Central Western Market

Rail Sales 800,000 Tons for Next Year—Heavy Coke Contracts

Sharp advances in Bessemer and basic pig iron have come in the past few days with the development of a strong situation in both. Following many weeks of quietness in steel-making iron, while steel products were steadily advancing, this sudden change has given almost sensational interest to the pig iron market. Sales of basic iron have amounted to about 75,000 tons, largely at \$14.75 and \$15 at Valley furnace, and the latter price is now minimum for first quarter delivery, while \$15.25 has been obtained.

Bessemer iron has sold at \$16 at Valley furnace for first quarter to the extent of 25,000 tons, and sellers ask that price for delivery this year also, finding current demand in excess of the supply.

In foundry iron, while buying has fallen off in Eastern markets, Lake furnaces have had a busy week, Buffalo reporting sales of 75,000 tons of basic, malleable and foundry irons. Prices there have advanced further. A sale of 5000 tons of basic iron at \$14.75 Valley for shipment to the Buffalo district indicates that Buffalo producers are holding basic considerably above the recent level.

The whole pig iron situation is stronger. There are indications that a good deal of the buying for 1913 thus far was the covering of a portion of requirements as an insurance against advances, and that the present rate of melting will mean further heavy buying. Producers are finding increasing indications of a sellers' market.

In Southern iron the recent minimum prices are disappearing. One Alabama seller that had not been fully abreast of the general movement has advanced to \$13.25, Birmingham, for No. 2 foundry for last quarter, and the tendency is still upward.

Rail buying continues the strong feature of the finished steel market. It is estimated that fully 800,000 tons has been booked for next year, this amount including 150,000 tons for the New York Central, or 35,000 tons more than the original contract of that system for 1912. The Steel Corporation will furnish 65,000 tons and the Lackawanna Steel Company the greater part of the remainder, several thousand tons going to the Bethlehem Steel Company. The Pennsylvania order is about to be placed and the Southern Railway is in the market.

Car works are far behind on orders and have been pressing for deliveries of steel. It is evident that they are sold up well into the spring and there is recent confirmation of what was said some time back that more cars were sold than were reported publicly.

In the buying of 1913, bars, sheets and tin plates have been conspicuous in the past week. All tin plate manufacturers are now booking business for next year at \$3.60, Pittsburgh. The sheet mills have found a

surprising demand for forward delivery. On blue annealed an advance of \$1 a ton was made last week to 1.55c., Pittsburgh, for No. 10.

Sales of bars for next year have gone on at a prodigious rate. Agricultural implement makers find indications that the demand for their products will be beyond precedent and the question has already come up of the ability of the mills to supply the needed steel. Jobbers have made large contracts for the first quarter and there have been some efforts to place business in which the speculative element figured, but the mills are refusing such orders.

There has been thus far no rush of plate and structural orders for next year. In the East the 500,000 tons of subway steel is a substantial backlog, but it will be stretched over several years. For the immediate future, construction prospects in the Central West and on the Pacific coast are most promising. In the past week the Arlington Hotel at Washington, 5500 tons, and an ore dock approach for the Great Northern, 3800 tons, were the chief contracts.

The tube trade of the world is at high mark. British tube works have lately bought American skelp at a price netting the mill \$2 to \$3 a ton more than the domestic price. Export rail sales recently referred to were at \$29, Pittsburgh, against the home price of \$28.

The coke market has been very active in the past week and contracts were closed for 200,000 tons of furnace coke a month for delivery through next year. Some of these were put through at \$2.40, but the greater part at \$2.50, and that price is now firmly held.

As pig iron advances more blast furnaces are preparing to blow in and output is likely to increase gradually in the remainder of the year. Some furnace companies are finding difficulty in getting a sufficient working force to start; in other cases the drawback is coke or ore or both. Some disappointment in ore shipments is now indicated and a shortage of coal at the head of the lakes is a certainty.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	Sept. 25, 1912.	Sept. 18, 1912.	Aug. 28, 1912.	Sept. 27, 1911.
Pig Iron, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	\$16.85	\$16.75	\$16.00	\$15.00
Foundry No. 2, Valley furnace	15.00	14.50	14.00	13.25
Foundry No. 2, Southern, Cincinnati	16.25	16.00	15.25	13.25
Foundry No. 2, Birmingham, Ala.	13.00	12.75	12.00	10.00
Foundry No. 2, at furnace, Chicago	16.50	16.50	15.50	14.50
Basic, delivered, eastern Pa.	16.00	16.00	16.50	14.50
Basic, Valley furnace	14.75	14.25	14.00	12.60
Bessemer, Pittsburgh	16.00	15.90	15.65	15.90
Malleable Bessemer, Chicago	17.00	17.00	15.50	14.50
Gray forge, Pittsburgh	14.90	14.65	14.40	13.65
Lake Superior charcoal, Chicago	17.75	17.75	16.25	16.50
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh	24.00	24.00	22.50	20.00
Open hearth billets, Pittsburgh	24.50	24.50	23.00	19.00
Forging billets, Pittsburgh	32.00	32.00	29.00	25.00
Open hearth billets, Philadelphia	28.00	27.90	25.40	22.40
Wire rods, Pittsburgh	27.00	27.00	27.00	26.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	17.00	17.00	16.25	14.00
Iron rails, Philadelphia	17.00	17.00	16.50	17.00
Car wheels, Chicago	14.75	14.50	14.00	12.75
Car wheels, Philadelphia	14.25	14.25	14.00	12.00
Heavy steel scrap, Pittsburgh	14.50	14.25	13.75	12.50
Heavy steel scrap, Chicago	13.00	12.75	12.25	10.00
Heavy steel scrap, Philadelphia	14.50	14.50	14.50	12.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Finished Iron and Steel,	Sept. 25, Sept. 18, Aug. 28, Sept. 27,			
	1912.	1912.	1912.	1911.
Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill...	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.47½	1.42½	1.40	1.22½
Iron bars, Pittsburgh.....	1.45	1.45	1.40	1.25
Iron bars, Chicago.....	1.45	1.45	1.40	1.20
Steel bars, Pittsburgh.....	1.35	1.35	1.30	1.15
Steel bars, tidewater, New York	1.31	1.31	1.46	1.31
Tank plates, Pittsburgh.....	1.40	1.40	1.35	1.25
Tank plates, tidewater, New York	1.56	1.56	1.56	1.41
Beams, Pittsburgh.....	1.40	1.40	1.35	1.30
Beams, tidewater, New York..	1.56	1.56	1.56	1.46
Angles, Pittsburgh.....	1.40	1.40	1.35	1.30
Angles, tidewater, New York..	1.56	1.56	1.56	1.46
Skelp, grooved steel, Pittsburgh	1.30	1.30	1.25	1.15
Skelp, sheared steel, Pittsburgh..	1.35	1.35	1.30	1.25

Sheets, Nails and Wire,

Per Pound to Largest Buyers:	Cents.			
	1912.	1912.	1912.	1911.
Sheets, black, No. 28, Pittsburgh	2.15	2.10	2.05	1.90
Wire nails, Pittsburgh.....	1.70	1.70	1.70	1.65
Cut nails, Pittsburgh.....	1.60	1.60	1.60	1.55
Fence wire, ann'd, 0 to 9, Pgh.	1.50	1.50	1.50	1.45
Barb wire, galv., Pittsburgh....	2.00	2.00	2.00	1.95

Coke, Connellsville, Per Net Ton at Oven.

Furnace coke, prompt shipment	\$2.50	\$2.40	\$2.25	\$1.50
Furnace coke, future delivery..	2.50	2.40	2.25	1.60
Foundry coke, prompt shipment	2.75	2.60	2.40	1.85
Foundry coke, future delivery..	2.75	2.75	2.50	2.10

Metals, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	17.75	17.75	17.75	12.50
Electrolytic copper, New York..	17.70	17.62½	17.65	12.25
Spelter, St. Louis.....	7.50	7.45	7.05	5.85
Spelter, New York.....	7.05	7.60	7.20	6.00
Lead, St. Louis.....	4.93	4.95	4.57½	4.32½
Lead, New York.....	5.10	5.10	4.65	4.47½
Tin, New York.....	50.10	49.00	46.25	38.87½
Antimony, Hallett, New York..	8.87½	8.30	7.87½	7.70
Tin plate, 100-lb. box, Pittsburgh	\$3.60	\$3.60	\$3.50	\$3.60

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¾-in. plates. Plates over 72 in. wide must be ordered ¾ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 316 in., take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.....	.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inc.	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inc.	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$27. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.50 galvanized, \$1.80. Galvanized barb wire, to jobbers, \$2; painted, \$1.70. Wire nails to jobbers, \$1.70.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.						
Nos.	0 to 9	10	11	12 & 12½	13	14
Annealed	\$1.65	\$1.70	\$1.75	\$1.80	\$1.90	\$2.00
Galvanized	1.95	2.00	2.05	2.10	2.20	2.30

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. and over, and zees, 3 in. and over, 1.40c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.....	1.45 to 1.50
H-beams over 18 in.....	1.45 to 1.50
Angles over 6 in.....	1.45 to 1.50
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card Sept. 1, 1909.....	1.45 to 1.50
Tees, 3 in. and up.....	1.45 to 1.50
Angles, channels and tees, under 3 in. plus full extras as per steel bar card Sept. 1, 1909....	1.45 to 1.50
Deck beams and bulb angles.....	1.70 to 1.75
Hand rail tees.....	2.15 to 2.30
Checkered, trough and corrugated floor plates.	2.30 to 2.55

Extras for Cutting to Length.

	Cents per lb.
Under 3 ft., to 2 ft. inclusive.....	.25
Under 2 ft., to 1 ft. inclusive.....	.50
Under 1 ft.....	1.55
No charge for cutting to lengths 3 ft. and over.	

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8.....	1.50
Nos. 9 and 10.....	1.55
Nos. 11 and 12.....	1.60
Nos. 13 and 14.....	1.65
Nos. 15 and 16.....	1.75

Box Annealed Sheets, Cold Rolled.

Nos. 10 to 12.....	1.80
Nos. 13 and 14.....	1.85
Nos. 15 and 16.....	1.90
Nos. 17 to 21.....	1.95
Nos. 22, 23 and 24.....	2.00
Nos. 25 and 26.....	2.05
No. 27.....	2.10
No. 28.....	2.15
No. 29.....	2.20
No. 30.....	2.30

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11.....	2.30
Nos. 12, 13 and 14.....	2.40
Nos. 15 and 16.....	2.55
Nos. 17 to 21.....	2.70
Nos. 22, 23 and 24.....	2.80
Nos. 25 and 26.....	3.00
No. 27.....	3.15
No. 28.....	3.30
No. 29.....	3.40
No. 30.....	3.60

Effective April 18, 1912, the rates for painted and formed roofing sheets, per 100 lb., are based on the following extras for painting and forming over prices for corresponding gauges in black and galvanized sheets:

Corrugated Roofing Sheets by Weight.

	29	25 to 28	19 to 24	12 to 18
Painting.				
Regular or oiling.....	.15	.15	.10	.05
Graphite, regular.....	.25	.25	.15	.10
Forming.				
2, 2½, 3 and 5 in. corrugated.....	.05	.05	.05	.05
2 V-crimped, without sticks.....	.05	.05	.05	.05
¼ to 1½ in. corrugated.....	.10	.10	.10	.10
3 V-crimped, without sticks.....	.10	.10	.10	.10
Pressed standard seam, with cleats.....	.15	.15	.15	.15
Plain roll roofing, with or without cleats.....	.15	.15	.15	.15
Plain brick siding.....	.20	.20	.20	.20
3-15-in. crimped.....	.20	.20	.20	.20
Weatherboard siding.....	.25	.25	.25	.25
Beaded ceiling.....	.25	.25	.25	.25
Rock face brick and stone siding.....	.25	.25	.25	.25
Roll and cap roofing, with caps and cleats.....	.25	.25	.25	.25
Roofing valley, 12 in. and wider.....	.25	.25	.25	.25
Ridge roll and flashing (plain or corrugated).....	.65	.65	.65	.65

Boiler Tubes.—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.		Standard Charcoal Iron.	
1¼ to 2¼ in.....	62	1¼ in.....	46
2½ in.....	64½	1½ to 2¼ in.....	48
2¾ to 3¼ in.....	69½	2½ in.....	53
3½ to 4 in.....	72	2¾ to 3¼ in.....	55½
5 and 6 in.....	64½	3½ to 5 in.....	58
7 to 13 in.....	62	Locomotive and steamship special grades bring higher prices.	

2½-in. and smaller, over 18 ft., 10 per cent. net extra.

2½ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (card weight), in effect from September 10, 1912, one point greater being allowed on merchant weight; iron pipe (full weight), from September 3, 1912:

Steel.			Iron.		
Inches.	Black.	Galv.	Inches.	Black.	Galv.
1/8, 1/4 and 3/8.....	72	52	3/8 and 1/2.....	65	48
1/2.....	76	66	3/8.....	67	51
3/4 to 3.....	79	71	1/2.....	70	57
			3/4 to 1 1/2.....	73	62
			2 and 2 1/2.....	74	63
Butt Weld.			Lap Weld.		
2.....	76	68	1 1/4.....	58	48
2 1/2 to 6.....	78	70	1 1/2.....	69	59
7 to 12.....	76	66	2.....	70	61
13 to 15.....	53	..	2 1/2 to 4.....	72	64
			4 1/2 to 6.....	71	63
			7 to 12.....	69	56
Plugged and Reamed.			Butt Weld, extra strong, plain ends.		
1 to 3, butt.....	77	69	1 to 1 1/2, butt.....	71	60
2, lap.....	74	66	2, butt.....	72	61
2 1/2 to 4, lap.....	76	68	1 1/4, lap.....	56	46
			1 1/2, lap.....	67	57
			2, lap.....	68	59
			2 1/2 to 4, lap.....	70	62
Lap Weld, extra strong, plain ends.			Butt Weld, double extra strong, plain ends.		
2.....	74	66	1/8 in.....	63	57
2 1/2 to 4.....	76	68	3/4 to 1 1/2.....	66	60
4 1/2 to 6.....	75	67	2 to 2 1/2.....	68	62
7 to 8.....	68	58			
9 to 12.....	63	53			
Lap Weld, double extra strong, plain ends.					
2.....	64	58	2.....	56	50
2 1/2 to 4.....	66	60	2 1/2 to 4.....	61	55
4 1/2 to 6.....	65	59	4 1/2 to 6.....	60	54
7 to 8.....	58	48	7 to 8.....	53	43

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Pittsburgh

PITTSBURGH, September 25, 1912.

In more lines of finished product, such as tin plate, sheets, and cold rolled shafting, makers have announced that they will accept business at present prices for delivery into the first quarter of 1913. Already a considerable tonnage of tin plate, sheets and railroad spikes has been sold for delivery in the first quarter of next year, and present market prices on practically all lines of finished iron and steel can be considered as the prices at which orders can be placed for first quarter and first half of 1913. The pig iron market is strong, with a fair amount of new inquiry for first quarter. Steel billets and sheet bars continue scarce, with dealers still able to get premiums of \$1 to \$2 a ton over regular mill prices. The feature of the week was the large amount of furnace coke sold for delivery over the first half and some over all of next year. A part of this went at \$2.40, but most of it was at \$2.50 per net ton at oven. The old material market is decidedly stronger; selected heavy melting scrap is firm at \$14.50 to \$14.75, with every indication of going to \$15 in the near future. Prices on everything in iron and steel lines are very strong, and the mills have only a limited tonnage of their products to spare for this year's delivery.

Pig Iron.—Prices on Bessemer pig iron seem to have advanced squarely to \$15.50 at Valley furnace for the remainder of this year and to \$16 for first quarter of 1913. Three or four sales of small lots, ranging from 100 to 300 tons, have been made for prompt delivery at \$15.50; sales of 4000 to 6000 tons to a local interest for first quarter also at \$15.50, and 25,000 tons for first quarter at \$16. Basic sales in the past week are estimated to have totaled about 75,000 tons, the latest at \$15, Valley furnace. A sale of 5000 tons of basic was made a few days ago to a Buffalo railroad supply manufacturer for December—February delivery at \$14.75, Valley furnace. The Westinghouse Electric & Mfg. Company has come in the market for upward of 25,000 tons of Nos. 1, 2 and 3 foundry for shipment in first half for its plants in East Pittsburgh.

Pittsburgh and Cleveland. There is a good general inquiry for foundry iron for first quarter. We quote standard Bessemer pig iron at \$16; malleable Bessemer, \$14.50; basic, \$14.75 to \$15; No. 2 foundry, \$14.50 for this year and \$15 for first quarter, and gray forge, \$13.75, all at Valley furnace, the freight rate to Pittsburgh being 90c. a ton.

Billets and Sheet Bars.—Very little has been sold in the open market in the past week, consumers being covered, but none of the larger steel mills has any steel to spare for delivery this year. Dealers have picked up small lots of billets and sheet bars for which they are asking premiums over regular prices, ranging from \$1 to \$2 a ton. We quote Bessemer billets at \$24 to \$24.50; Bessemer sheet bars, \$24.50 to \$25; open hearth billets \$24.50 to \$25 and open hearth sheet bars about \$25.50, Pittsburgh or Youngstown mills, and for delivery within six to eight weeks. Axle billets are quotable at about \$30, and forging billets for general forging purposes are about \$32, f.o.b. mill Pittsburgh.

Ferroalloys.—Reports are that several leading English producers have again advanced prices on 80 per cent. ferromanganese, now asking \$59.50 Baltimore, for first half of 1913. So far as known none has been sold at this price, but a local consumer is reported to have bought 1200 tons in the early part of last week, deliveries 200 tons a month, for first half, at \$56.50, Baltimore. We quote 80 per cent. ferromanganese at \$59 to \$60, Baltimore, for prompt delivery, the freight rate to the Pittsburgh district being \$1.95 a ton. We quote 50 per cent. ferrosilicon in lots up to 100 tons at \$72.50; over 100 tons to 600 tons, \$71.50, and over 600 tons, \$70.50, Pittsburgh. The lower grades are ruling at \$20 for 10 per cent., \$21 for 11 per cent. and \$22 for 12 per cent., f.o.b. cars at Ashland, Ky., or Jackson, Ohio. On ferrotitanium we quote 8c. per lb. for carload lots, 10c. per lb. in 2000-lb. lots and over and 12 1/2c. per lb. in lots up to 2000 lb.

Steel Rails.—No important orders for standard sections were taken locally in the past week, but inquiries are reported from several important roads for next year's delivery. The new demand for light rails is active, the Carnegie Steel Company having received orders and specifications in the past week for about 3200 tons. We quote splice bars at 1.50c. per lb. and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45-lb. sections, 1.25c.; 16 and 20-lb., 1.30c.; 12 and 14-lb., 1.35c., and 8 and 10-lb., 1.40c., all in carload lots f.o.b. Pittsburgh.

Wire Rods.—Sales of high carbon open hearth rods have been made as high as \$31, Pittsburgh, in small lots for prompt shipment. An inquiry is out for 1200 tons of either Bessemer or open hearth rods at the option of the mill, and one maker states that he could readily secure \$27.50 from this buyer if he had the rods to spare. We quote Bessemer, open hearth and chain rods at \$27 to \$27.50, Pittsburgh.

Muck Bar.—No sales have been reported in the past week. Standard makes of muck bar are firm at \$31, Pittsburgh.

Skelp.—No large contracts for skelp have recently been placed, but the market is firm. We quote grooved steel skelp at 1.30c. to 1.35c.; sheared steel skelp, 1.35c. to 1.40c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.75c. to 1.80c., delivered at buyer's mill in the Pittsburgh district.

Structural Material.—Local fabricators are not actively seeking new business, being practically filled for the remainder of this year. Large jobs in the local market, for which inquiries are expected soon, are the Magee Memorial Hospital, 1800 tons, and the new Hotel Augusta, 5000 to 6000 tons. The latter is to be built on Smithfield street in this city, and work on it is expected to start early next year. We quote beams and channels up to 15 in. at 1.40c. to 1.45c., Pittsburgh, for the remainder of this year and first quarter of next.

Plates.—No car orders were placed in the past week with local fabricators, and inquiries are rather light. The local plate mills are filled up for the remainder of this year, but are now taking contracts for first quarter of 1913 on the basis of 1.40c. to 1.45c. for 1/4 in. and heavier. Premiums of \$2 to \$3 a ton are being obtained over these prices by smaller mills that can make deliveries in six to eight weeks.

Iron and Steel Bars.—Quite a heavy tonnage of steel bars has already been sold for delivery in the first quarter of 1913 at 1.35c., Pittsburgh. All the

leading mills are now entering orders for first quarter delivery at this price. The new demand is fairly active, and specifications against contracts for delivery this year are coming in freely. We quote merchant steel bars at 1.35c. for delivery over the remainder of this year and into first quarter of 1913, and common iron bars at 1.45c. to 1.50c. at mill for the remainder of this year, several makers stating they are holding firm at the higher price. Makers of steel bars quote the following extras for twisting: $\frac{3}{4}$ in. and larger, \$1 per net ton; $\frac{1}{2}$ and $\frac{3}{8}$ in., \$2 per net ton.

Hoops and Bands.—The new demand is fairly active, and most of the mills have their product practically sold up for the remainder of this year. We quote steel bands at 1.35c., with extras as per the steel bar card, and hoops at 1.45c. f.o.b. Pittsburgh, for the remainder of this year and into first quarter.

Sheets.—There has been a general advance of \$1 per ton on blue annealed sheets, making No. 10 gauge 1.55c. On Monday the American Sheet & Tin Plate Company opened its books for contracts for sheets for delivery through the first quarter of 1913 on the basis of 1.55c. for No. 10 blue annealed; 2.15c. for No. 28 box annealed, one-pass, cold rolled black sheets and 3.30c. for No. 28 galvanized. Consumers have been importuning the mills for some time to accept their contracts for first quarter. The new demand for sheets is active. The commitments of all the mills are so great that none of them is able to take on any considerable tonnage of new business for this year. The output, though enormously heavy, is still far short of meeting the demand, and all the mills are back in deliveries. Already a considerable tonnage has been sold for first quarter. We quote No. 10 blue annealed sheets 1.55c.; No. 28 black 2.15c. and No. 28 galvanized 3.30c. for the remainder of this year and first quarter of next year.

Tin Plate.—The leading makers have opened their books for business for first quarter, on the basis of \$3.60 for 14 x 20 coke plates. For several months the consumers of tin plate who make finished products that necessitate their knowing a long time in advance what their tin plate will cost have been insisting that the mills accept contracts for first quarter. Several contracts have been placed on this basis and it is expected that in October new buying will be heavy. Specifications are now showing a marked falling off, as this is the lag end of the tin plate season. We quote tin plate at \$3.60 per box for 14 x 20 coke plates f.o.b., Pittsburgh for delivery over the remainder of this year and into first quarter.

Bolts and Rivets.—A further advance of 5 per cent. has been made in prices of bolts, but rivets are unchanged. The new demand continues heavy. Most of the bolt and rivet makers have their product sold up over the remainder of this year and have a good deal of business on their books for first quarter. Present prices on bolts are based on 1.30c. for steel bars, but as these are now selling at 1.35c. to 1.40c., with deliveries hard to get, it is not unlikely there will be another advance on bolts in the near future. We quote as follows: Button head structural rivets, \$1.90 per 100 lb. base; cone head boiler rivets, \$2 in carloads only, an advance of 10c. to 15c. being charged for smaller lots. Discounts on bolts are as follows: Coach and lag screws, 80 and 12½ per cent. off; small carriage bolts, cut threads, 75, 10 and 2½ per cent. off; small carriage bolts, rolled threads, 75, 10, 2½, 7½ per cent. off; large carriage bolts, 70, 10 and 2½ per cent. off; small machine bolts, rolled threads, 75, 10, 7½ per cent. off; small machine bolts, cut threads, 75, 10, 5 per cent. off; large machine bolts, 70, 10 and 10 per cent. off; square hot pressed nuts, blank and tapped, \$5.90 off, and hexagon nuts, \$6.55 off. These prices are in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works.

Shafting.—The demand is heavy, and specifications against contracts are coming in freely. It is stated that never in the history of the shafting trade have prices been so closely observed as they are at present. The Columbia Steel & Shafting Company, Pittsburgh, announces that it has opened its books for first quarter on the basis of 60 per cent. in carloads and larger lots and 55 per cent. off in small lots. We quote cold rolled shafting for delivery this year at 62 per cent. off in carloads and 57 per cent. in less than carloads delivered in base territory.

Spelter.—Prime grades of Western spelter are firm at 7.40c., East St. Louis, equal to 7.52½c., Pittsburgh. A sale of 200 tons for October delivery has been made at this price.

Railroad Spikes.—The Erie Railroad has placed an

order for 10,000 kegs for first quarter with a local maker. Inquiries from other roads for next year are quite active, but makers are not anxious to take contracts, as they believe prices will be higher. We quote railroad spikes in base sizes, 5½ x 9/16 in., and also small railroad and boat spikes at \$1.80 per 100 lb., f.o.b. Pittsburgh, for remainder of this year and first quarter of 1913.

Wire Products.—The demand for wire nails is now very heavy, and specifications against contracts are coming in freely. Leading makers state that prices are being absolutely observed. As indicating the strength of the market, it can be stated that a leading mill has taken a contract for about 3000 kegs of wire nails for delivery in first quarter at \$1.75 base per keg. The new demand for barb wire and fence wire is more active, and indications point to a very heavy fall trade. We quote wire nails at \$1.70 per keg; cut nails \$1.60 to \$1.65; galvanized barb wire, per 100 lb., \$2; painted, \$1.70; annealed fence wire \$1.50, and galvanized fence wire \$1.80, f.o.b. Pittsburgh, usual terms, freight added to point of delivery. Jobbers charge the usual advances over these prices for small lots from store.

Merchant Steel.—The new demand is fairly heavy, and mills report that specifications are still coming in freely. Most makers have their product pretty well sold up for the remainder of this year, and prices are firm. We quote: Iron finished tire, 1½ to ¾ in. and larger, 1.30c., base; under ¾ in., 1.40c.; planished tire, 1.50c.; channel tire, ¾, 7/8 and 1 in., 1.80c.; 1½ in. and larger, 1.65c.; toe calk, 1.85c., base; flat sleigh shoe, 1.35c.; concave and convex, 1.70c.; cutter shoes, tapered or bent, 2.30c.; spring steel, 1.90c.; machinery steel, smooth finish, 1.70c., all f.o.b. cars, Pittsburgh.

Merchant Pipe.—So crowded are the local mills that the Philadelphia Company of this city, which came in the market recently for about 20 miles of 6-in.-iron pipe, could not get the deliveries wanted and placed the order with an Eastern mill. Local pipe mills are practically sold up for the remainder of this year and are behind in deliveries from 6 to 10 weeks. The discounts on steel pipe as of September 10 and on full weight iron pipe as of September 3 are being firmly held. One leading mill has already sold this year a considerably larger tonnage of steel pipe than it sold in all of last year.

Boiler Tubes.—The new demand is fairly heavy. Railroads are specifying freely against contracts for locomotive tubes placed some time ago. On seamless steel tubing, several makers report that they are out of the market for the rest of this year. The new demand for merchant tubes is active, and discounts are being firmly held.

Coke.—The situation in furnace coke is very strong, a large tonnage having been closed for delivery in first half and some for all of next year. The Youngstown Sheet & Tube Company has bought 16,000 tons per month for each of its three blast furnaces now in operation, and 12,000 tons per month for its fourth blast furnace, shipments to start about April, 1913, and has also bought 6000 tons per month, commencing January and running through all of 1913, for its cupolas and steel works. The total purchase by this company is thus about 54,000 tons per month, starting January, which will be increased in April to about 70,000 tons per month. It is understood that the business was divided among three leading coke concerns and the price paid was slightly under \$2.50 per net ton at oven. A Shenango Valley furnace interest and a Cleveland consumer have each bought 10,000 to 12,000 tons of standard furnace coke per month for all of 1913 at \$2.50 at oven. The Producers' Coke Company, Uniontown, Pa., which is handling the coke of a number of important producers, has sold 60,000 to 70,000 tons of furnace coke for first half and for all of next year at \$2.50. It is now learned that several weeks ago a leading Connellsville operator sold 20,000 tons per month for all of next year at about \$2.40 at oven. In the past two weeks, there have been sold fully 200,000 tons per month of furnace coke for next year. The minimum price on furnace coke today for first half of 1913 is \$2.50 at oven. Some makers believe the price may go to \$2.75 or \$3 before the end of the year. All indications point to an enormous demand for furnace coke for next year. With the scarcity of labor, there may be a shortage in the supply. Foundry coke is also much firmer, in sympathy, and standard makes of 72-hour are selling at \$2.75 up to \$2.90 for prompt shipment, while prices quoted for first half of next year are \$2.75 to \$3 per net ton at oven. We quote strictly standard makes

of 72-hour foundry coke at \$2.75 to \$3 per ton for first half but some makes are obtainable at \$2.60 to \$2.75. The output in the Upper and Lower Connellsville regions last week was 372,781 net tons, an increase over the previous week of 14,942 tons.

Old Material.—The whole scrap market is strong, and prices on several grades, notably heavy steel scrap and low phosphorus melting stock, are higher. The embargo on borings and turnings routed to the West Penn Steel Company, Brackenridge, Pa., has been lifted and the embargo on scrap for the Pittsburgh Steel Company, Monessen, Pa., has also been lifted, and this has improved the local situation a good deal. There is a very active inquiry for heavy steel scrap and for low phosphorus melting stock, heavy sales of the latter having been made in the past week. Dealers who do not have steel scrap on hand are not anxious to sell, thinking the market will be still higher, and they are afraid to sell short. One leading consumer has bought 1000 tons of low phosphorus melting stock at \$17.25, and 1500 tons at \$17.50 delivered at one of its works, and about 1500 tons delivered at another plant. Sales of 3000 to 4000 tons of heavy steel scrap have been made at \$14.50 to \$14.75 delivered in the Pittsburgh district, which is the absolute minimum of the market, with some dealers holding for \$15. Sales are also noted of about 1000 tons of No. 1 foundry cast at \$13.50; 1000 tons of turnings at \$11.10, and 500 tons of borings at \$10, all delivered in the Pittsburgh district. Dealers are now quoting as follows, per gross tons:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	\$14.50 to \$14.75
No. 1 foundry cast	13.50 to 13.75
No. 2 foundry cast	12.50 to 12.75
Bundled sheet scrap, f.o.b. consumers' mills Pittsburgh district	12.50 to 12.75
Re-rolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	15.00 to 15.25
No. 1 railroad malleable stock	13.00 to 13.25
Grate bars	9.75 to 10.00
Low phosphorus melting stock	17.25 to 17.50
Iron car axles	24.50 to 25.00
Steel car axles	16.50 to 16.75
Locomotive axles	25.00 to 25.50
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	8.50 to 8.75
Old car wheels	14.00 to 14.25
*Cast-iron borings	10.00 to 10.25
*Machine shop turnings	11.10 to 11.25
†Sheet bar crop ends	15.00 to 15.25
Old iron rails	15.75 to 16.00
No. 1 R. R. wrought scrap	14.75 to 15.00
Heavy steel axle turnings	11.25 to 11.50
Stove plate	10.25 to 10.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

Chicago

CHICAGO, ILL., September 24, 1912.

Inquiries for pig iron have decreased somewhat. This is not considered to be an indication that requirements are entirely satisfied but rather due to the fact that, having filled a portion of their needs, buyers are willing to wait for a time to determine what the outcome of the present price situation is to be. The consumptive demand of melters is emphasized by the urgent requests for early shipment of pig iron bought for delivery through the remainder of the year. Negotiations for rails which have been pending have resulted in the booking of a large volume of business, while a number of important contracts are still to be closed. The demand for track supplies has been in keeping with the liberal inquiry for rails. The rush of fall construction work has brought heavy pressure on the already overcrowded mills and is taxing the resources of jobbers' stocks. So heavy has been the demand for material out of store that the territory of the larger jobbers has widened out to meet the depletion of smaller stocks. In many directions the fear of car shortage is productive of precautionary anticipation and signs are not lacking that what is now only threatening will develop into a real handicap.

Pig Iron.—Coincident with the rapid advance in pig iron prices, a cessation in buying activity has appeared in this market. This lull is not so marked as to exclude a number of important purchases the past week nor are other inquiries for considerable tonnages entirely lacking. It is also a generally acknowledged fact that a large proportion of melters' requirements in this territory for the first half still remains to be covered. In many cases, buyers have been led to cover their needs in part because of the rising market but have determined to await further developments before completing their purchases. Present indications do not

point to a more advantageous market for the buyer although the efforts being made by furnace interests to place added capacity in blast at as early a date as possible may operate in that direction. The Federal Furnace Company expects to blow in its second stack the latter part of October, the Thomas Furnace Company, Milwaukee, hopes to have its furnace in very shortly and the expectation of the Iroquois Iron Company is that its four stacks will all be making iron before the end of the year. This will leave only the small Spring Valley furnace of all the merchant capacity in this district out of operation. Prices for local iron continue on the basis of \$17 at the furnace. The situation as regards Southern iron is about as reported a week ago except that the minimum price for Birmingham iron is now \$13.25 for the remainder of the year and \$13.50 for first quarter. A sale is recorded for first half delivery at \$13.75. It is understood that those interests holding at \$14 are practically out of the market. Deliveries of iron are being specified promptly, and in some instances the anticipation of shipment is being requested. We quote local irons, f.o.b. furnace, the average switching charge to Chicago foundries being nearly 50c. per ton. Other quotations are for Chicago delivery. Prices on prompt shipment are as follows:

Lake Superior charcoal	\$17.75 to \$18.25
Northern coke foundry, No. 1	17.00 to 17.50
Northern coke foundry, No. 2	16.50 to 17.00
Northern coke foundry, No. 3	16.00 to 16.50
Northern Scotch, No. 1	17.50 to 18.00
Southern coke, No. 1 foundry and No. 1 soft	17.85 to 18.35
Southern coke, No. 2 foundry and No. 2 soft	17.35 to 17.85
Southern coke, No. 3	16.85 to 17.35
Southern coke, No. 4	16.35 to 16.85
Southern gray forge	16.10 to 16.35
Southern mottled	16.10 to 16.35
Malleable Bessemer	17.00
Standard Bessemer	17.50 to 18.00
Basic	17.00
Jackson Co. and Kentucky silvery, 6 per cent.	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8 per cent.	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10 per cent.	19.90 to 20.40

Rails and Track Supplies.—A part of the rail tonnage which has been under negotiation between Western railroads and local mills has finally been placed while equally heavy bookings still remain to be definitely closed. Large orders for tie plates and track fastenings are also noted, interest in these materials extending to practically all of the railroads. We quote standard railroad spikes at 1.80c. to 1.85c., base; track bolts with square nuts, 2.20c. to 2.30c. base, all in carload lots, Chicago; tie plates, \$30 to \$32.50 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—The largest building contract closed the past week was for 6109 tons for the new Cook County hospital, Chicago, taken by the American Bridge Company. Other sales by this company include 3680 tons to the Great Northern Railway for an approach to an ore dock; 205 tons to the Blodgett Construction Company, Vicksburg, Miss.; 141 tons to the Chicago & Northwestern Railway. The St. Paul Foundry Company, St. Paul, Minn., sold 141 tons for a high school building at Great Falls, Mont.; the Worden-Allen Company sold 135 tons to the Lake Milling, Smelting & Refining Company, Point Mills, Mich., and the Alfred E. Norton Company received an order for 120 tons for a warehouse for the Peden Iron & Steel Company, Houston, Texas. Four highway spans to be built in Yuba County, Cal., for which bids had been received on 157 tons, will be built of reinforced concrete instead of steel. Car lettings have been as follows: For the Northern Pacific, 2500 steel underframes to the Western Car & Foundry Company; for the Wabash Railroad, 500 hopper car bodies. The Chicago, Burlington & Quincy is figuring on 500 steel underframes for flat cars. Considerable construction, particularly of buildings, is being delayed, it is known, by the inability of mills to promise shipments definitely. The Steel Corporation has opened its books for first quarter business on the basis of \$1 a ton advance over fourth quarter prices. We quote for Chicago delivery, mill shipment, on plain shapes, 1.58c. to 1.68c.

The pressure on warehouse stocks of structural material, retarding deliveries ten days to two weeks, is being somewhat relieved by the ordering of shapes in long lengths rather than cut to short sizes. Fabricating shops in a position to handle material in lengths can improve delivery two or three days by so ordering. We quote for base sizes from store, 2c.

Plates.—Universal plates for delivery in five or six weeks are being sold in this market on the basis of 1.60c., Pittsburgh, while mill shipments offering no better delivery than three or four months are noted on the basis of 1.50c., Pittsburgh. Other makers are continu-

ing to take business at 1.45c., Pittsburgh, shipment to be made in the regular routine. The leading interest is taking first half business at 1.40c. for first quarter, with \$1 advance for second quarter. We quote for Chicago delivery, mill shipment, 1.58c. and 1.68c.

Warehouse deliveries on plates cut to sizes are about ten days behind, but the situation in this respect has not been allowed to grow worse although the continually increasing limitations of the mills have thrown a growing demand upon jobbers' stocks. We quote for delivery from store, base price 2c.

Sheets.—A still further advance in the mill price of galvanized sheets seems imminent as the spread between these prices and the quotations on black sheets does not yet cover the added cost of manufacture, particularly in view of the higher values of spelter. Some of the local mills are in an easier position with reference to blue annealed sheets and are taking business at prices \$2 a ton below other current quotations, the minimum price being 1.78c., Chicago. Deliveries on blue annealed are readily obtainable in four weeks. We quote Chicago delivery in carload lots from mill as follows: No. 28 black sheets, 2.33c.; No. 28 galvanized, 3.48c., and No. 10 blue annealed, 1.78c. to 1.88c.

Sheet tonnage out of store has increased to the extent of being one of the largest items now moving from jobbers' stocks, and as the tonnage which the mills have to offer for this year's shipment decreases, this volume has grown. The demand for galvanized sheets in particular has been heavy and a recent advance has placed store quotations somewhat out of line with other grades of sheets as well as present mill prices. We quote on sheets from jobbers' stocks, as follows: No. 10 blue annealed, 2.15c.; No. 28 black, 2.70c., and No. 28 galvanized, 3.95c.

Bars.—While the leading interest continues to quote 1.35c., Pittsburgh, on steel bars and is contracting for first quarter shipment on that basis other important makers will sell only at prices \$1 a ton higher. Premium prices as high as 1.65c., Chicago, also prevail. For bar iron 1.50c., Chicago, is now the ruling price, and only in exceptional instances can 1.45c. be done. The heavy demand for reinforcing bars of both soft and hard steel and the shortage of old steel rail scrap have added to the already firm situation on hard steel bars, and one interest is practically withdrawn from the market. We quote, for mill shipment, as follows: Bar iron, 1.45c. to 1.50c.; soft steel bars, 1.53c. to 1.65c.; hard steel bars, 1.40c. to 1.60c.

The demand for bars out of store is increasingly heavy. This is due in large part to the requirements of fall construction work, and is applicable particularly to twisted reinforcing bars. Deliveries are somewhat delayed by requirements of cutting to sizes. We quote soft steel bars, 1.90c.; bar iron, 1.90c.; reinforcing bars, 1.90c., base, with 5c. extra for twisting in sizes $\frac{3}{4}$ in. and over, and 7½c. extra for smaller sizes; shafting, 57 per cent. off.

Rivets and Bolts.—The advance in the price of rivets to the basis of 2.08c., Chicago, has become more general, although one large interest continues willing to take business at prices \$2 a ton less. Advances in the price of machine and carriage bolts and nuts are also noted. One of the largest makers of bolts is four months behind in its mill deliveries. We quote from mill as follows: Carriage bolts up to $\frac{3}{4}$ in. x 6 in., rolled thread, 75-10-7½; cut thread, 75-10-2½; larger sizes, 70-10; machine bolts up to $\frac{3}{4}$ in. x 4 in., rolled thread, 75-10-10-2½; cut thread, 75-10-7½; larger sizes, 75-10-5; coach screws, 80-12½; hot pressed nuts, square head, \$5.90 off per cwt.; hexagon, \$6.55 off per cwt. Structural rivets, $\frac{3}{4}$ to 1½ in., 1.98c. to 2.08c., base, Chicago, in carload lots; boiler rivets, 0.10c. additional.

Out of store we quote for structural rivets, 2.20c., and for boiler rivets, 2.30c. to 2.50c. Machine bolts up to $\frac{3}{4}$ x 4 in., 75-5; larger sizes, 70-5; carriage bolts up to $\frac{3}{4}$ x 6 in., 75 off; larger sizes, 70 off.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Company was awarded the contract for 2800 tons for Dayton, Ohio, on which, as announced last week, it was the low bidder. This company was also awarded the contract for 450 tons for Bottingham, Ohio. Bonds have been issued and sold by Blanchard, Iowa, for a waterworks system. Special elections are to be held at Epworth, Iowa, and Saline, Mich., for consideration of waterworks projects. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$30; 6 to 12 in., \$28; 16 in. and up, \$27, with \$1 extra for gas pipe.

Wire Products.—The demand for small spikes by railroads, in addition to liberal specifications for nails, barb wire and woven wire fencing, has made this the busiest month this year or last in the wire trade. Jobbers are requiring large stocks of nails and wire to keep up with the demand for small lots from warehouses. The demand for woven wire fencing is not quite so heavy as a few weeks ago, but the fabricators are showing no let up in their activities, and most of the mills are being operated night and day. We quote

as follows: Plain wire, No. 9 and coarser, base, \$1.68; wire nails, \$1.88; painted barb wire, \$1.88 to \$1.93; galvanized, \$2.18; polished staples, \$1.93; galvanized, \$2.23, all Chicago.

Old Material.—The scarcity of railroad lists and the tenacity with which dealers are holding accumulated stocks on the apparent expectation of still higher prices continue to preserve the strength of the scrap iron situation. During the past week the Chicago, Milwaukee & St. Paul has offered 1700 tons and the Chicago, Burlington & Quincy 2200 tons, but aside from these offerings little railroad scrap is available. Recent purchases of railroad scrap, now available for shipment to consumers, are forcing local dealers to furnish shipping instructions on this class of material, but they show no disposition to part with scrap that they can conveniently hold. Country dealers are more inclined to sell, but the movement of scrap both from railroads and dealers continues to be greatly restricted by the scarcity of labor and the shortage of cars. A shortage of steel rails particularly is noted. We have advanced our prices about 25c. a ton over those quoted last week. We quote for delivery at buyer's works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.	
Old iron rails	\$17.00 to \$17.50
Old steel rails, rerolling	15.25 to 15.75
Old steel rails, less than 3 ft.	14.00 to 14.50
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	14.75 to 15.25
Heavy melting steel scrap	13.00 to 13.50
Frogs, switches and guards, cut apart	13.00 to 13.50
Shoveling steel	12.75 to 13.25
Steel axle turnings	10.00 to 10.50

Per Net Ton.	
Iron angles and splice bars	\$15.50 to \$16.00
Iron arch bars and transoms	17.00 to 17.50
Steel angle bars	12.50 to 13.00
Iron car axles	21.50 to 22.00
Steel car axles	16.50 to 17.00
No. 1 railroad wrought	13.25 to 13.75
No. 2 railroad wrought	12.25 to 12.75
Cut forge	12.25 to 12.75
Steel knuckles and couplers	12.25 to 12.75
Steel springs	12.75 to 13.25
Locomotive tires, smooth	13.75 to 14.25
Machine shop turnings	8.25 to 8.75
Cast and mixed borings	7.00 to 7.50
No. 1 busheling	11.25 to 11.75
No. 2 busheling	8.25 to 8.75
No. 1 boilers, cut to sheets and rings	8.75 to 9.25
Boiler punchings	12.75 to 13.25
No. 1 cast scrap	13.00 to 13.50
Stove plate and light cast scrap	11.25 to 11.75
Railroad malleable	12.75 to 13.25
Agricultural malleable	11.25 to 11.75
Pipes and flues	10.25 to 10.75

Philadelphia

PHILADELPHIA, PA., September 24, 1912.

The active demand for foundry pig iron continues, heavy inquiries being brought out by steadily advancing prices. A further advance of 25c. a ton has been made on leading brands, and some producers are practically sold up for this year. The demand for finished iron and steel products continues heavy, but with less premium business, as producers are pretty well sold up for the near future. Billets are being freely inquired for, but mills are practically sold up. Consumers would make contracts for first quarter requirements freely, but in very few cases are producers ready to open order books for forward deliveries.

Iron Ore.—Negotiations are still pending in connection with sales of Wabana ore. Consumers are also looking round for further supplies of domestic ores, because of increasing activity of blast furnaces. Several sellers of both foreign and domestic ores have not yet named quotations for 1913. Importations at this port during the week included 12,256 tons of Swedish and 5800 tons of Cuban ore.

Pig Iron.—While buying has probably been in smaller volume, consumers have come into the market freely for additional quantities for this year as well as early in 1913. Negotiations for several large blocks of both high and low grade iron, aggregating over 10,000 tons, referred to last week, are still pending and inquiries for 15,000 to 20,000 tons more have recently come out, including 3500 tons of mixed grades of charcoal and coke foundry iron from the Norfolk & Western Railroad for first quarter. A local jobbing foundry has an inquiry out for 1000 to 1500 tons, while numerous small lot propositions are being received daily. Virginia cast iron pipe makers are asking for additional supplies, one being in the market for 3000 tons for first quarter and another for 1500 tons for this year. Delaware River

cast iron pipe makers have been taking on odd lots, while new inquiries, aggregating several thousand tons, are noted. Off grade iron for pipe making appears to be strong at \$16, delivered. The majority of the sales in the higher grades recently have been in small lots at prices showing a rather wide range, \$16.85, \$17 and \$17.25, delivered, having been done for standard brands of eastern Pennsylvania No. 2 X foundry for fourth quarter. In almost every case \$17 is now named as a minimum for this grade although several sellers have advanced to \$17.25 as a minimum; on the other hand, quotations of \$16.85 and \$16.90 are still held open, but are subject to early withdrawal. Virginia pig iron producers have arrived at a more settled basis of quotations. For delivery in the first quarter, or in instances the first half, \$15 at furnace for No. 2 X is now pretty generally quoted, with No. 2 plain ranging from \$14.50 to \$14.75. Some producers are sold up on No. 2 X for varying periods during the last quarter, but \$14.50, furnace, for No. 2 X, and \$14.25 for No. 2 plain can be done, although sellers are not offering freely on this basis. These prices are equivalent to a range of \$17.30 to \$17.50, delivered here, for No. 2 X. Quite a number of moderate sized lots have been sold on this basis, while some little business has been put through for first quarter at \$17.80 to \$18, delivered here. Further sales of rolling mill forge iron have been made against the recent 10,000-ton inquiry at \$16, delivered. Higher prices are now being asked for this grade. Very little movement in steel making grades is noted. Basic consumers have practically covered for fourth quarter needs and also for a good portion of their first quarter needs. Several unclosed inquiries for first quarter are, however, still pending. A sale of 1000 tons of low phosphorus at \$21.50 is noted, with smaller lots going at \$22, delivered here. The leading producer of Lebanon Valley low phosphorus pig is reported sold up for the remainder of the year. Quotations on all grades are very firm and an advancing tendency is still apparent. For fourth quarter delivery in buyers' yards in this district the following range of prices is named:

Eastern Pennsylvania No. 2 X foundry	...\$16.85 to \$17.25
Eastern Pennsylvania No. 2 plain	..... 16.60 to 16.85
Virginia No. 2 X foundry	..... 17.30 to 17.50
Virginia No. 2 plain	..... 17.05 to 17.25
Fray forge	..... 16.00 to 16.50
Basic	..... 16.00 to 16.50
Standard low phosphorus	..... 21.50 to 22.00

Ferroalloys.—The market is in a chaotic condition. Quotations for 80 per cent. ferromanganese for first half of 1913 are entirely nominal at \$56.50 to \$59.50, seaboard. Sales of prompt ferromanganese have been made at \$60 and \$62.50, seaboard, with \$65 asked. Very little movement of ferrosilicon is noted, the 50 per cent. grade being quoted at \$72.50, with the 10 per cent. furnace grade at \$23.30, delivered in this district.

Billets.—Eastern producers who can make deliveries of rolling billets have no difficulty in obtaining \$28, delivered in this district, for moderate sized orders, and have made a number of sales on that basis. Higher prices have also been obtained in some instances, dependent on delivery and customer. Eastern mills continue to take business for Western delivery. Mills are now pretty well sold up for the remainder of the year and have not yet opened books for next year, although inquiries for such delivery have been numerous. Forging billets have been fairly active and are quoted at \$30 and \$32, base, f.o.b. Eastern mills, according to customer and delivery asked.

Plates.—Business coming to the Eastern mills continues in large volume, no difficulty being experienced in obtaining full prices for delivery over the remainder of the year. In instances some sizable business for delivery over the next two months, including one 3000 and one 1500 ton lot, for Pacific coast shipment is noted. Eastern makers still refuse to quote for delivery beyond the year end. While some producers unable to make satisfactory delivery continue to name prices around 1.50c., delivered here, Eastern mills readily obtain 1.65c. for sheared plates for September-October delivery; for November shipment 1.70c. and for December shipment 1.75c., while universal plates command an advance of \$1 a ton over these prices.

Structural Material.—New business of any important character continues light, although a number of moderate sized projects are before the trade. Both makers of plain shapes and the majority of the fabricators in this district are fully engaged and are not seeking business aggressively. Fabricated material prices are steadily hardening. Mills find it difficult to make satisfactory shipments, eight weeks being considered, in instances, as good delivery. Prices are de-

cidedly firm, with 1.65c., delivered, done freely on contracts covering the remainder of the year, while prompt shipments from stock command 1.80c. to 1.85c., f.o.b. mill.

Sheets.—Eastern mills are well sold ahead and are operating at full capacity. Inquiry is reported good, consumers being anxious to cover for extended forward requirements, but producers in this district refuse to sell beyond the year end. Western No. 28 gauge sheets are quoted at 2.25c. to 2.30c., delivered in this district. Eastern mills name 1.85c. minimum, delivered, for blue annealed, and on No. 18 and lighter gauges readily obtain an advance of ¼c. to ½c. per lb. for smooth, loose-rolled sheets.

Bars.—Steel bars for early 1913 delivery are quoted at 1.50c. to 1.55c., delivered here, and a moderate volume of business is reported closed. Prompt steel bars are scarce and command premiums. Specifications on contracts continue heavy. With steel bars scarce, the demand for iron bars has materially increased and, with the larger volume of business coming out, makers have advanced prices. Ordinary iron bars are no longer available at recent quotations, 1.47½c. to 1.52½c., delivered here, about representing the present range of the market. As high as 1.60c., mill, has been paid for extra prompt iron bars.

Coke.—Prices appear to be gradually working toward a higher level. While business closed has not been large, some fair orders for foundry and furnace coke for early delivery have been entered. Foundry coke is now quoted at \$2.75 to \$3 at oven, for forward shipment, while contract furnace coke is being held at \$2.50 to \$2.70. Sales have been made, however, at \$2.40, and for prompt coke slightly better has been done. The following range of prices, per net ton, delivered in buyers' yards in this district about represents the market:

Connellsville furnace coke	.....\$4.65 to \$4.95
Connellsville foundry coke	..... 4.85 to 5.10
Mountain furnace coke	..... 4.15 to 4.45
Mountain foundry coke	..... 4.50 to 4.75

Old Material.—The market for steel scrap is considerably quieter, although that for rolling mill grades continues strong. Steel mills in this district have been buying freely recently and have difficulty, owing to restricted labor forces, in moving material delivered. Embargoes are in force at several mills. Under the circumstances buying has been somewhat restricted. Moderate buying in rolling mill grades is noted without material change in prices, cast borings being practically the only grade on which prices have stiffened. The following range of prices about represents the market for deliveries in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate ranging from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap and crops	.....\$14.50 to \$15.00
Old steel rails, rerolling (nominal)	..... 16.00 to 16.50
Low phosphorus heavy melting steel scrap	..... 17.75 to 18.25
Old steel axles	..... 18.50 to 19.00
Old iron axles	..... 24.50 to 25.50
Old iron rails (nominal)	..... 17.00 to 17.50
Old car axles	..... 14.25 to 14.75
No. 1 railroad wrought	..... 16.50 to 17.00
Wrought iron pipe	..... 13.25 to 13.75
No. 1 forge fire	..... 12.50 to 13.00
No. 2 light iron (nominal)	..... 7.50 to 8.00
Wrought turnings	..... 11.00 to 11.50
Cast borings	..... 10.50 to 11.00
Machinery cast	..... 14.00 to 14.50
Grate bars, railroad	..... 11.00 to 11.50
Stove plate	..... 11.00 to 11.50
Railroad malleable (nominal)	..... 12.50 to 13.00

Cleveland

CLEVELAND, OHIO, September 24, 1912.

Iron Ore.—There has been a limited amount of chartering of wild tonnage for ore at an advance of 15c. above the regular rates. Most shippers, however, have enough contract tonnage to move their ore. Shipments are going ahead at a rapid rate and it is expected the September movement will be about at the rate of the previous three months. A car shortage is causing considerable delay in shipments from mines to upper lake ports. There is also some shortage of cars for moving ore from lower lake ports to furnaces. We quote prices as follows: Old Range Bessemer, \$3.75; Mesaba Bessemer, \$3.50; Old Range non-Bessemer, \$3.05; Mesaba non-Bessemer, \$2.85.

Pig Iron.—The market is fairly active on all grades and at advanced prices. Local prices on foundry iron have further stiffened up and \$16 at furnace for No. 2 is now the minimum quotation made by Cleveland furnaces for early or 1913 delivery. The \$16 Cleveland price has been established by a number of sales both

for local delivery and outside shipment. Among those for out of town delivery was one of between 2000 and 3000 tons. The Massillon Iron & Steel Company, which had an inquiry out for 5000 tons of No. 3 and No. 4 foundry, as noted last week, is reported to have bought that amount. It is probable that some Valley foundry iron may still be had at \$15 for the last quarter, but the general quotation for the first half is \$15.25 to \$15.50. Some sales are reported at \$15.25. There is considerable inquiry for small lots. Basic inquiries aggregating 75,000 to 100,000 tons have come up in the week. It is reported that basic has sold in the past day or two at \$15. Some producers are now holding for higher prices. It is probable that one or two Valley furnaces that have long been out of blast will be blown in in the near future. These furnaces have bought their ore supply but are now confronted with the problem of scarcity of labor which may delay their blowing in. For prompt shipment and for the first half we quote, delivered at Cleveland, as follows:

Bessemer	\$16.40 to \$16.65
Basic	15.40 to 15.65
Northern No. 2 foundry.....	15.90 to 16.25
Southern No. 2 foundry.....	16.85 to 17.35
Jackson County silvery, 8 per cent. silicon.....	18.05 to 18.55

Coke.—The market is firm and quite active. Contracts for considerable furnace coke for the first half have been placed at \$2.50 at oven for standard Connells-ville brands. We also note the sale of 4000 tons for November and December shipment to a Valley furnace at the same price. It is claimed that not much furnace coke, except in small lots, is available for the remainder of the year. There is some demand for foundry coke for prompt shipment from foundries that did not cover for their entire requirements. We quote standard 72-hour foundry coke at \$2.90 to \$3 at oven.

Old Material.—The market is firm and fairly active but sales are mostly in small lots. In spite of the heavy consumption mills are not taking scrap on contract as fast as dealers would like. Local dealers are offering little scrap for extended future delivery as they expect somewhat better prices. Some are holding heavy steel scrap at \$13.50 to \$13.75 for contracts. Recent demand has stiffened prices for old iron and steel rails. Other quotations are unchanged. Dealers' prices, f.o.b. Cleveland, are as follows:

Per Gross Ton.	
Old steel rails, rerolling.....	\$14.50 to \$15.00
Old iron rails.....	14.50 to 15.00
Steel car axles.....	18.50 to 19.00
Heavy melting steel.....	13.00 to 13.25
Old car wheels.....	13.50 to 14.00
Relaying rails, 50 lb. and over.....	22.00 to 22.50
Agricultural malleable.....	10.50 to 11.00
Railroad malleable.....	13.25 to 13.50
Light bundled sheet scrap.....	10.00 to 10.50

Per Net Ton.	
Iron car axles.....	\$20.00 to \$21.00
Cast borings.....	7.50 to 7.75
Iron and steel turnings and drillings.....	8.00 to 8.25
Steel axle turnings.....	8.50 to 8.75
No. 1 busheling.....	11.00 to 11.25
No. 1 railroad wrought.....	12.50 to 13.00
No. 1 cast.....	12.00 to 12.50
Stove plate.....	9.50 to 10.00
Bundled tin scrap.....	11.00 to 11.50

Finished Iron and Steel.—There is considerable inquiry for contract material for the first quarter. While a moderate tonnage has been contracted for none of the sellers appears to desire to take on business and some of the mills are oversold to such an extent that they are declining to take orders for next year. The general price for the first quarter is 1.35c. for bars and 1.40c. for plates and structural material. Some sales have been made at an advance of 50c. to \$1 a ton over these prices. There is no falling off in specifications and mills generally are unable to get in better shape on deliveries. New inquiry for early delivery is confined mostly to small lots. Eastern mills are selling plates for prompt shipment at 1.50c. to 1.60c. at mills and structural material at 1.50c. For delivery in six weeks \$1 a ton lower is quoted. There is considerable demand for small lots of structural material and some sizes are very scarce. One local manufacturer being unable to secure the sizes wanted anywhere in the Central West placed an order with a Waverly, N. J., warehouse. Revised bids for the Superior Avenue bridge, Cleveland, requiring 4500 tons of steel will be opened October 2. Sheets are firm at the new price and some of the mills are sold up for the remainder of the year. There is considerable demand for billets. A local mill is selling open hearth billets at \$24.50 for this year's delivery. Makers of hard steel bars have advanced prices \$1 a ton to 1.35c. Pittsburgh for car lots and 1.40c. for less than car lots. Iron bars are firm at 1.50c., Cleveland. Lo-

cal bar iron mills are sold up for this year. The Lake Shore Railroad has an inquiry out for 3000 tons for the first quarter but mills are not inclined to quote for that delivery. Some spike sales for the first quarter are noted at the new price of \$1.80. There is a good demand for standard section rails for traction lines. One sale of 500 tons is reported. Inquiries pending aggregate 3000 to 4000 tons. Warehouse orders are heavy and jobbers are behind on deliveries. Stock prices on steel bars are 1.95c., iron bars 1.85c. to 1.90c. and shapes and plates 2.15c.

Cincinnati

CINCINNATI, OHIO, September 25, 1912.—(By Telegraph.)

Pig Iron.—Very little prompt shipment iron is being sold by either Southern or Northern producers, but recent bookings for delivery during the first quarter and half of next year have been very satisfactory considering the heavy business in the month of August. Local agencies are working on a long expected inquiry from a nearby consumer for 20,000 tons of basic, for first quarter shipment, which will probably go to Valley furnaces. A Michigan manufacturer is asking for 1200 tons of foundry iron to analyze from 3 to 3½ per cent. silicon, and a like quantity to run from 2½ to 3 per cent., shipments to commence in October and to be extended through March. From northern Michigan is a 500-ton inquiry for No. 2 foundry iron to be shipped during the next six months. Prices are very strong and only a few Southern interests are willing to accept \$13, Birmingham basis, for prompt shipment, the majority of them holding out for \$13.25 to \$13.50, while for first quarter movement \$13.50 to \$14 is universally quoted. In the Iron-ton district \$15 can still be done for shipment this year, but only on a small quantity, and this price is expected to disappear within the next few days and the minimum firmly established at \$15.50, which is the general quotation. Both basic and malleable have also stiffened. Quite a number of small orders for Southern and Lake Superior charcoal iron have been booked lately, and Jackson County silvery is also in better demand for first half shipment. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft.....	\$16.50
Southern coke, No. 2 foundry and 2 soft.....	16.25
Southern coke, No. 3 foundry.....	16.00
Southern coke, No. 4 foundry.....	15.75
Southern gray forge.....	15.50
Ohio silvery, 8 per cent. silicon.....	\$17.70 to 18.20
Southern Ohio coke, No. 1.....	16.45 to 16.95
Southern Ohio coke, No. 2.....	16.20 to 16.70
Southern Ohio coke, No. 3.....	15.70 to 16.20
Southern Ohio malleable Bessemer.....	16.20
Basic, Northern.....	16.20
Lake Superior charcoal.....	17.50
Standard Southern car wheel.....	25.75 to 26.00

(By Mail)

Coke.—In spite of a reported increase in Connells-ville production, both furnace and foundry coke for prompt shipment are hard to obtain. However the car shortage has considerable to do with the indifference of oven operators in taking on new business for shipment this year. There is a fairly good inquiry for foundry grades and also some scattered furnace business in sight, but few new contracts have been signed up lately. While we quote Connells-ville 48-hr. coke around \$2.40 to \$2.50 per net ton, at oven, several producers are asking as high as \$2.60 to \$2.65. In the Wise County and Pocahontas fields from \$2.35 to \$2.50 is asked. Foundry coke in all three districts is quotable at \$2.75 to \$3 per net ton, at oven, but it would be hard to obtain any quantity below the last named figure, and in a few instances \$3.25 is the quotation.

Finished Material.—The local mill reports the demand for both black and galvanized sheets as holding up well, and prices are very firm on No. 28 gauge at 2.15c., Pittsburgh, for black sheets and 3.30c. for galvanized. Local warehouses are also enjoying a good business and the call for structural material has not abated. We quote steel bars from local stocks at 2c. and structural material, cut to lengths when desired, at 2.10c. Railroad track material, including frogs and switches, is in excellent demand, and in some instances prompt deliveries cannot be made. Several local mill agencies have received instructions to submit all orders before final acceptance, indicating that they are getting further behind on deliveries.

Old Material.—Advances made last week are being well maintained. The rolling mills are taking their share of scrap, and the demand from foundries in this territory is also improving. Railroad offerings are light just at the moment, and it is quite probable that railroad

officials are waiting to see what the pig iron market will do before turning loose any more large quantities of scrap. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton.	
Bundled sheet scrap	\$10.00 to \$10.50
Old iron rails	13.75 to 14.25
Relaying rails, 50 lb. and up	21.75 to 22.75
Re-rolling steel rails	12.00 to 12.50
Melting steel rails	11.00 to 11.50
Old car wheels	13.00 to 13.50

Per Net Ton.	
No. 1 railroad wrought	\$11.50 to \$12.00
Cast borings	7.00 to 7.50
Steel turnings	7.75 to 8.25
No. 1 cast scrap	11.00 to 11.50
Burnt scrap	7.75 to 8.25
Old iron axles	17.75 to 18.25
Locomotive tires (smooth inside)	12.00 to 12.50
Pipes and flues	7.50 to 8.00
Malleable scrap	9.25 to 9.75
Railroad tank and sheet scrap	7.00 to 7.50

St. Louis

ST. LOUIS, Mo., September 23, 1912.

Pig Iron.—The buying which has characterized the market for some weeks now shows some let up, partly because large consumers are pretty well covered and partly because of the stiffness of prices. The small melters are still buying, however, and their demands are running into very good totals. Present contracts are running from 500 tons down, and transactions are under very satisfactory conditions. A sale of 500 tons of malleable is the nearest approach to a large item in the sales of the week. Inquiries include one for 10,000 tons of basic which is expected to go to a Southern furnace and may be increased to 20,000 tons if the final quotations are satisfactory. There is also an inquiry for 1000 tons of malleable. Otherwise, the new business in the market runs to the requirements of the small melters.

Finished Iron and Steel.—Orders have kept up to the usual total of the recent past. One notable feature was the placing of orders for about 3000 tons of track fastenings which are very strong at quotations and harder than ever to get. There are feelers in the market for standard rails. In structural material the business has been excellent, the flow of orders being up to recent figures. In light rails the lumber and coal interests are buying freely. In general, the whole finished steel market here is one of fight for deliveries.

Old Material.—Prices of all the principal items are moved up this week. In the quotation list there is a very sharp demand for relaying rails, in part due to the inability of the rolling mills to deliver new rails. This is expected to increase, and higher quotations are looked for soon. There is also a sharp demand for cast iron and foundry grades generally. Both rolling mills and foundries are in need of material. Railroad lists out this week include 300 tons from the Southern, 200 tons from the Minneapolis & St. Louis, 1000 tons from the Missouri Pacific and 500 tons from the Chicago & Eastern Illinois. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.	
Old iron rails	\$15.50 to \$16.00
Old steel rails, re-rolling	13.75 to 14.25
Old steel rails, less than three feet	13.50 to 14.00
Relaying rails, standard section, subject to inspection	23.50 to 24.00
Old car wheels	15.50 to 16.00
Heavy melting steel scrap	13.50 to 14.00
Frogs, switches and guards cut apart	13.50 to 14.00

Per Net Ton.	
Iron fish plates	\$13.00 to \$13.50
Iron car axles	19.50 to 20.00
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	11.50 to 12.00
Railway springs	11.00 to 11.50
Locomotive tires, smooth	13.50 to 14.00
No. 1 dealers' forge	9.00 to 9.50
Mixed borings	8.00 to 8.50
No. 1 busheling	11.00 to 11.50
No. 1 boilers, cut to sheets and rings	8.00 to 8.50
No. 1 cast scrap	11.75 to 12.25
Stove plate and light cast scrap	9.00 to 9.50
Railroad malleable	10.25 to 10.75
Agricultural malleable	9.25 to 9.75
Pipes and flues	8.00 to 8.50
Railroad sheet and tank scrap	8.00 to 8.50
Railroad grate bars	9.25 to 9.75
Machine shop turnings	8.00 to 8.50

Coke.—The market has been quiet but firm, with prices somewhat out of line with those of other markets, especially on foundry coke which is in chief re-

quest in this territory. Representatives here are quoting about 25c. higher per ton at oven than the generally published figures, but are only placing comparatively small orders. Car shortage, labor and oven conditions are affecting the situation. By-product coke is ranging from \$5.70 to \$6.20 per net ton, delivered St. Louis, with little doing.

Buffalo

BUFFALO, N. Y., September 24, 1912.

Pig Iron.—Sales have again been heavy, aggregating 75,000 tons of foundry malleable, basic and charcoal to a wide range of consuming interests, for delivery during first half. Prices have been further advanced, \$16.50 f.o.b. Buffalo, now being asked for No. 1 foundry and \$16.25 for No. 2 X, malleable and basic. There has been an extraordinary increase in consumption the past few weeks by melters who purchase in this market, some of the smaller having increased their consumption from 100 to 400 per cent., and furnaces are not able to keep pace in production with the current insistent demand. A complete revolution in market conditions has been effected and a state has been reached where it appears to be absolutely a seller's market. If the present ratio of demand keeps up it will be a matter of only a short time when the production capacity of furnaces in this district will be taken up for first half. In fact, it is now a question of the buyer being able to find a seller who will accept his business for desired deliveries. For first half delivery we quote as follows f.o.b. Buffalo:

No. 1 foundry	\$16.50 to \$16.75
No. 2 X foundry	16.25 to 16.50
No. 2 plain	16.00 to 16.25
No. 3 foundry	15.75 to 16.00
Gray forge	15.75 to 16.00
Malleable	16.25 to 16.50
Basic	16.25 to 16.50
Charcoal, according to brand and analysis	17.50 to 18.50
Charcoal, special brand and analysis	20.00 to 21.50

Old Material.—The market continues active with a good local demand. Transactions are chiefly in small lots, however, as dealers are inclined to hold material for higher prices. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	\$14.00 to \$14.25
Low phosphorus steel	16.50 to 17.00
No. 1 railroad wrought	14.00 to 14.50
No. 1 railroad and machinery cast scrap	13.75 to 14.25
Old steel axles	16.00 to 16.75
Old iron axles	23.00 to 23.75
Old car wheels	14.75 to 15.25
Railroad malleable	13.25 to 13.50
Boiler plate, sheared	14.50 to 15.00
Locomotive grate bars	11.50 to 12.00
Wrought pipe	10.00 to 10.50
Tank iron	10.50 to 10.75
Wrought iron and soft steel turnings	8.25 to 8.75
Clean cast borings	7.50 to 8.00

Finished Iron and Steel.—The heavy demand for finished products reported last week has continued. Mills are becoming more and more crowded with orders, and some are obliged to turn down more tonnage than they are taking on. They are also becoming more critical in the acceptance of orders and scrutinize very closely even small ones that are offered. In a great many instances they are declining to accept large contracts, preferring to distribute the small quantities available among their customers as far as they will go. Instances have developed where offered tonnages have been cut in half and even down to 25 per cent. of the customer's requirements. All mills, as far as can be learned, are declining to sell except to regular customers and considerable difficulty is being experienced by other users in placing their orders. The ruling prices are now 1.35c. Pittsburgh base, for bars and small shapes and 1.45c. for plates and structural material. One independent interest announces that for first quarter business it has advanced its price to 1.40c. Pittsburgh base, for bars and 1.50c. for plates and shapes. The Lackawanna Steel Company has received contract from the Boston Transit Commission for furnishing 1000 tons of steel reinforcing bars for subway work, taken at the ruling price of 1.35c. Pittsburgh base. In fabricated structural lines the demand for material for new building projects continues to develop, but principally for next spring erection, as fabricators find it impossible to secure the delivery of steel in any quantities before February and March. Architect Ulysses G. Orr has plans on the boards for the seven-story Poppenberg commercial building at Main, Carleton and Washington streets, Buffalo, to be erected next spring, requiring about 1500 tons. The Buffalo Structural Steel Company has been awarded

contract for fabrication and erection of steel for the Curtiss Building on Franklin street, Buffalo, taking 750 tons, and the Lackawanna Bridge Company has received contract for the fabrication and erection of the steel for a slasher mill to be built by the Spanish River Pulp & Paper Mill Company at Sturgeon Falls, Ont., 300 tons, and also contract for the steel for the plant at Birmingham, Ala., of the American Radiator Company, requiring about 2000 tons.

German Markets Continue Strong

BERLIN, September 12, 1912.

Trade reports indicate that the strong position of the market has been fully maintained. On the Düsseldorf Exchange on Friday ordinary commercial bars of basic steel were quoted at 122 to 126 marks, as compared with the previous quotation of 121 to 126 marks, and bands were marked up 2.50 marks to 142.50 to 147.50 marks. There is still a brisk foreign demand.

Pig Iron Production Making a New Record

The situation in the pig iron trade is indicated by the fact that the Pig Iron Syndicate's shipments in August exceeded its allotments by 1½ per cent., while July shipments had been 10 per cent. below the full allotments. The August production establishes a new record. With a total of 1,487,448 metric tons, it beat the July production—the previous record—by 19,400 tons.

The Siegen Ore Syndicate has given out its July report, showing a reduction in stocks of 12,350 tons during the month. The month's shipments reached 205,777 tons, against 195,236 tons in June, while production was 193,423 tons, against 180,730 tons.

The imports of ores in August amounted to 1,180,900 tons, or 119,200 tons more than August, 1911. The export of ores fell off by 61,000 tons.

The Cutlery Trade

The Solingen cutlery trade has made steady improvement in the past few months, though not equal in all branches of the trade. There is a general revival in the home demand for cutlery, but the home market consumes less than one-third of the product of the shops. In the foreign trade there is a certain irregularity in the demand from different countries. The American demand has grown more active after the interruption caused by the tariff difficulties of last spring. Business with Mexico has been restricted by the political turmoil there, but a marked increase in the trade with Argentina is reported. The Far Eastern demand, with the exception of China, is very active. European countries other than Turkey and Italy are mostly buying at their usual rate, but some losses have recently been suffered through the bankruptcy of Russian firms. The shops complain that English cutlery in increasing quantities is coming into Germany and even French makes have latterly been gaining a foothold here. The goods in question are in the main table cutlery with horn handles, which are delivered at such low prices as not to cover the cost of production at Solingen.

Dividends of Steel Companies

The Phoenix Company, one of the greatest companies of Germany, announces a dividend of 18 per cent., which compares with 15 per cent. for the two previous years. The net earnings, after writing off considerably larger amounts than usual, were \$6,911,000, as against \$5,827,000 last year.

The Mannesmann Tube Works, Düsseldorf, will pay 12½ per cent., the same as for last year, but on an increased capital.

Germany's exports of pig iron in August reached 79,430 tons, against 62,163 tons in August, 1911; blooms and billets, 57,430 tons, against 57,907 tons; beams and other structural shapes, 42,470 tons, against 33,670 tons; steel rails and ties, 32,510 tons, against 42,457 tons.

The upward movement in the Belgian market continues in a pronounced form. At the end of last week it was announced that an advance of 2 to 3 shillings on export orders for all grades of plates had been made and that both iron and basic steel bars had been marked up 2 shillings for export. This morning a Brussels dispatch appears reporting a further advance of 2 shillings on plates for export. The new price for heavy plates is £6 14s to £6 16s, with 2 shillings more for medium thicknesses. Steel strips were raised 4 shillings, being now £6 9s to £6 13s. The home market price for Thomas (basic) pig iron has been raised 2 francs, being now quoted at 82 to 84 francs.

British Pig Iron Prices Lower

Warrant and Makers' Prices Decline—

A Fear of Checking Consumption

MIDDLESBROUGH, ENGLAND, September 25, 1912.

(By Cable.)

Pig iron is less active. Bulls in the warrant market are liquidating moderately and the feeling is hardly so confident. There are some complaints that prices are checking consumption. Stocks of pig iron in store are 278,019 tons, against 279,805 tons last week. The German Steel Works Union has sold largely of semi-finished steel and has raised prices again. The general industrial position remains excellent. Tin plates have advanced slightly. We quote as follows:

Cleveland pig iron warrants (closing Tuesday), 66s. 9d. against 67s. 11d. one week ago.

No. 3 Cleveland pig iron, maker's price, f.o.b. Middlesbrough, 67s. 6d., against 68s. 9d. one week ago.

Steel sheet bars (Welsh) delivered at works in Swansea Valley £5 17s. 6d. for January-March delivery.

German sheet bars, f.o.b. Antwerp, 110s.

German 2-in. billets, f.o.b. Antwerp, 104s., an advance of 1s. 6d.

German basic steel bars, f.o.b. Antwerp, £6 4s.

Steel bars, export, f.o.b. Clyde, £7 15s. to £7 17s. 6d.

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £7 5s. nominal, with an advance imminent.

German joists, f.o.b. Antwerp, £5 12s. to £5 15s.

Steel ship plates, Scotch, delivered local yard, £8 2s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 15s.

Steel rails, export, f.o.b. works port, £6 7s. 6d. to £6 10s.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 15s. 4½d., an advance of 1½d. from last week.

New York

NEW YORK, September 25, 1912.

Pig Iron.—Sales of pig iron in this territory have fallen off noticeably in the past week, but there is a beginning of new inquiry which may mean another buying movement. While a number of the large consumers have made fair purchases for the early months of next year and some of them for the first half, there are indications that nothing like the requirements of these buyers have been covered and that some of them are likely to need iron for this year. In general there has not been any such scale of buying in the East as has been reported in recent weeks from Central Western markets. The inquiry now before Buffalo furnaces is from foundries in a variety of lines in New York State and New England. Some Canadian foundries are also in the market, the inquiry from that source including 8000 tons for a pipe works. Buffalo furnaces are quite generally quoting \$16 at furnace for No. 2 X and one company is asking \$16.25 to \$16.50 for higher silicon irons, the latter price for 3 per cent. silicon. Eastern Pennsylvania furnaces selling in New Jersey territory, which have been asking \$16 for this year's delivery, have now advanced to \$16.50 for No. 2 X at furnace, which has been their price for 1913 delivery. It should be said that the asking prices of all furnaces have advanced rather rapidly of late and that these have not been realized in actual transactions, though it is not unlikely that they will be established if another considerable buying movement ensues. There is evidence of a considerable impending demand from pipe works for iron for delivery in the first quarter of 1913. The basic iron requirements of Eastern Pennsylvania buyers are considerable, over and above what has been provided for by the purchases of the past month for shipment in the early months of next year. We quote as follows for Northern iron at tidewater: No. 1 foundry, \$16.75 to \$17; No. 2 X, \$16.25 to \$16.75; No. 2 plain, \$16 to \$16.25. Southern iron is quoted at \$17.50 to \$17.75 for No. 1 foundry and \$17.25 to \$17.50 for No. 2.

Structural Material.—No very large building contracts are being figured on in this district at present, the major part of the work coming up for estimate consisting of numerous small railroad jobs, all the railroads in the East being in the market but for nothing large. Large Eastern fabricating works are operating at about 85 per cent of capacity and even with present forces could do somewhat more. Bids went in this week on the armory of the Eighth Coast Artillery in New York which will require somewhat under 8000 tons. The largest Eastern contract let was the Arling-

ton Hotel, Washington, 5500 tons, which was taken by the American Bridge Company. A new pier theatre at Atlantic City calling for 1250 tons of steel was let to the Owego Bridge Company. Another award was for a 650-ton addition to the Old Dominion smelter building of Phelps, Dodge & Co. interests, at Globe, Arizona. The five sections of subway work in New York City already alluded to are now before the fabricating interests and while the general contractors are known the steel awards are still uncertain. The total of steel requirements is about 23,000 tons. The Cranford Company will have two sections on the lower end of the island, the John F. Stevens Construction Company a section in the Bronx, and the Degnon Contracting Company two sections in Brooklyn. There are still pending several New York buildings, including the New York Central Y. M. C. A. building at Park Avenue and Forty-ninth street, 1200 tons, on which bids have gone in; the United Cigar Stores Building, at 42d street and Vanderbilt avenue, 1400 tons, and the garages of the Pierce and Ford companies at Long Island City, amounting to about 3500 tons. The J. C. McGuire garage on East 102d street, 500 tons, was awarded to the Prince Iron Works. The Belmont Iron Works has taken the contract for the new building of the Crane Valve Company, Bridgeport, Conn., 400 tons. The Pennsylvania Steel Company will furnish 200 tons for street crossing spans for the Pennsylvania Railroad in Jersey City. In New York City the steel for the Broad Exchange building, 41 Broad street, 350 tons, will be furnished by Levering & Garrigues. Considerable work is being done on which premiums are paid for early delivery, such contracts going to the Eastern fabricating works of moderate or smaller capacity. Contracts for plain material for delivery in the first quarter of 1913 are being made on the 1.40c. basis, Pittsburgh, and some sellers are naming 1.45c. for such deliveries. We quote plain material at 1.56c. to 1.61c. New York, mill shipments, and 2.15c. from store.

Plates and Bars.—The local business in plates continues to be largely one in which premiums figure. From eastern Pennsylvania mills sales are made on a Pittsburgh basis of 1.50c. for sheared plates, with 0.16c. freight added to New York, though from Eastern mill the freight to New York is 0.09c. For a barge which will be built at Bayonne, N. J., 350 tons of plates were sold in the past week for delivery in October to December. Considerable tank work is being done and dredge bucket and other riveted work, though boiler construction is no considerable factor. In bars there is considerable activity. Some contracts with jobbers have been made running to April 1. A western Pennsylvania manufacturer of steel bars has opened its books for 1913 in the past week at 1.35c. Pittsburgh, which is the basis already announced by three other important companies. One maker is quoting 1.40c. on bars for the second quarter. At the same time 1.30c. Pittsburgh has not entirely disappeared. Eastern bar mills are very busy and the spike trade is particularly active. We quote sheared plates at 1.56c. to 1.66c. New York and universal plates at 1.61c. to 1.71c. Quotations on bars are as follows: Steel bars, 1.46c. to 1.51c., New York, and from store, 2c.; iron bars, 1.45c. to 1.50c., New York, and from store, 1.90c.

Ferroalloys.—Ferromanganese, 80 per cent., is exceedingly strong at \$56.50, Baltimore, forward delivery, and it is safe to predict that any extensive buying would send quotations up without loss of time. As it is some sellers are asking \$59.50 on advices from producers whom they represent. The range of prices, as was stated last week, is far more elastic than normally exists and the situation is one which has excited keen interest if not anxiety on the part of users of ferromanganese. Within the last week a sale of 100 tons of ferromanganese for early delivery was made at \$65, and it is admitted that the stimulus of a few more sales at that figure would send prices up still further. The price to-day is the highest since September, 1907, when \$57, Baltimore, was quoted. Until this year ferromanganese has shown a steady decline year by year. In 1907 it showed a steady decline month by month from \$77 in January of that year. The only reasons vouchsafed for the recent advances in prices have been conditions which have been some time in formation abroad and the great consumption here resulting from the increased manufacture of open hearth steel in this country. In the last week or ten days 4000 to 5000 tons have been closed for next year's delivery at prices ranging from \$56.50 upward, but mostly at or near the base price. Ferrosilicon, 50 per cent., is quoted at \$72.50 to \$75, Pittsburgh, for carload lots, and less for larger tonnages. Several firms have not as

yet opened their books for next year's business, but they will do so within a few days.

Cast Iron Pipe.—The demand for small sizes continues to be the feature of the market. Foundries are so well filled on this class of work that they are unable to make early delivery on new orders, but could do somewhat better on large sizes for which the demand is not up to its usual proportion of the aggregate. Public lettings are few, but not much business of this character is expected so late in the season. Carload lots of 6-in. are quoted at \$23.50 to \$24 per net ton, tide-water.

Old Material.—A good demand for heavy melting steel scrap is coming from dealers who have contracts to fill. This demand has been sufficient to maintain the strength of the market, although some apprehension is felt as to the course of prices in the immediate future because of threatened embargoes at some of the steel plants in eastern Pennsylvania. The largest dealers are, however, confident that such a condition would be but temporary and express their belief in much higher prices eventually. Rolling mills are stubbornly resisting advances on wrought scrap, but may probably be obliged to change their views because of the great scarcity of steel billets which may compel them to increase their iron output, thus causing them to purchase more scrap iron. The foundries are still laggards, and the cast scrap market therefore continues quiet. Dealers' quotations, per gross ton, New York and vicinity, are about as follows:

Old girder and T rails for melting.....	\$12.00 to \$12.50
Heavy melting steel scrap.....	12.00 to 12.50
Relaying rails	21.50 to 22.00
Rerolling rails	14.00 to 14.50
Iron car axles	22.00 to 22.50
Old steel car axles	16.00 to 16.50
No. 1 railroad wrought	13.75 to 14.25
Wrought-iron track scrap	13.00 to 13.50
No. 1 yard wrought, long.....	12.50 to 13.00
No. 1 yard wrought, short	12.00 to 12.50
Light iron	5.25 to 5.50
Cast borings	7.75 to 8.00
Wrought turnings	8.75 to 9.00
Wrought pipe	11.50 to 12.00
Old car wheels	13.75 to 14.25
No. 1 heavy cast, broken up.....	11.50 to 12.00
Stove plate	9.00 to 9.25
Locomotive grate bars	9.00 to 9.25
Malleable cast	10.50 to 11.00

Metal Market

NEW YORK, September 25, 1912.

The Week's Prices

Cents Per Pound for Early Delivery.							
Copper, New York.			Lead.		Spelter.		
Sept.	Lake.	Electro-lytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
19.....	17.75	17.65	49.85	5.10	4.95	7.60	7.45
20.....	17.75	17.65	50.00	5.10	4.95	7.60	7.45
21.....	17.75	17.65	50.00	5.10	4.95	7.60	7.45
23.....	17.75	17.70	50.10	5.10	4.95	7.65	7.50
24.....	17.75	17.70	49.95	5.10	4.95	7.65	7.50
25.....	17.75	17.70	50.10	5.10	4.95	7.65	7.50

Copper sales have aggregated fair figures, and prices are stronger. Tin, after a brief period of activity, is quiet at prices which are well maintained. Lead is slow and unchanged in price. Spelter continues its advancing movement. All grades of antimony have further advanced.

New York

Copper.—There has been cautious but steady buying of copper for October, November and to a less extent for December, to help provide for the unaltered domestic consumption. While none of the sales has been notable for large size when considered individually, the aggregate undoubtedly reached fairly big figures. Prices have stiffened under the steady demand and 17.75c., cash New York, is the rock bottom price for Lake, and 17.75c. delivered, 30 days, is the bottom price for electrolytic and it is understood that premiums have been paid for spot copper in a few instances. The strike of miners in Utah has excited interest and discussion, but no tangible effects of those troubles have been felt in the market, and this is natural in view of the fact that there are enormous quantities of copper which await refining. Lake copper has been in better demand than electrolytic and some special brands are quoted up to 17.87½c. The metal was quoted in London to-day at £78 18s. 9d. for spot and £79 18s. 9d. for futures. The exports of copper this month total 19,203 tons.

Tin.—The sale of Banca tin in Rotterdam to-day realized 134¼ florins, which is equal to 49c., c.i.f. The price is low as compared with the London market and the effects of the sale, at which there were 2500 tons disposed of, will be awaited with interest, the result depending largely upon the interests that acquired the

metal. In the latter part of last week the tin market was fairly active for spot and September delivery and the indications at that time were that an attempt was being made to corner September tin, although if such an attempt was made it was abandoned before it got very far. The conditions would appear to have been favorable for such a corner in view of the statistics which show that, while close to 4600 tons of tin will be available this month, between 3700 and 3800 tons will be required for consumption, leaving no wide margin between the requirements of tin and the amount available. Prices, however, are such as to promote conservative buying and if an effort was made to corner the market it evidently failed through insufficient buying support. The high prices, it is admitted, are a result of natural conditions helped along somewhat by manipulations. The price of spot tin in London this morning was £228 and futures £226 5s. The arrivals of tin this month were 3311 tons and there is afloat 2450 tons.

Tin Plates.—The tin plate situation continues very strong, and in many quarters a further advance is looked for.

Lead.—The consumption of lead is large and the market rules firm with unchanged prices, namely, 5.10c., New York, and 4.95c., St. Louis. The market is without features of special interest.

Spelter.—The market in spelter is strong and prices have advanced to 7.65c., New York, and 7.50c., St. Louis. Large consumers are taking spelter heavily against old contracts. Actual sales were made to-day at 7.65c., New York.

Antimony.—All grades of antimony, for which there are many inquiries both for spot and future delivery, have been advanced in price. Cookson's is quoted at 9.25c., Hallett's at 8.87½c., and Chinese and Hungarian grades at 8.75c.

Old Metals.—With a continued good demand dealers are firmly maintaining the following selling prices:

	Cents per lb.
Copper, heavy and crucible.....	16.50 to 16.75
Copper, heavy and wire.....	16.25 to 16.50
Copper, light and bottoms.....	14.25 to 14.50
Brass, heavy.....	10.25 to 10.50
Brass, light.....	8.25 to 8.50
Heavy machine composition.....	13.00 to 13.25
Clean brass turnings.....	9.50 to 9.75
Composition turnings.....	12.00 to 12.50
Lead, heavy.....	4.75
Lead, tea.....	4.50
Zinc scrap.....	5.75

Chicago

SEPTEMBER 24.—With the exception of copper, prices of all the principal metals advanced during the past week. Trading, however, fell off considerably from the active movement of the preceding 10 days. We quote as follows: Casting copper, 17.50c.; Lake, 17.87½c. to 18c., in carloads for prompt shipment; small lots, ¼c. to ½c. higher; pig tin, carloads, 51.25c.; small lots, 53.25c.; lead, desilverized, 5c. to 5.05c. for 50-ton lots; corroding, 5.25c. to 5.30c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 7.70c.; Cookson's antimony, 9.75c., and other grades, 9.25c. in small lots; sheet zinc is \$8.90 f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 14.75c.; copper bottoms, 13c.; copper clips, 14c.; red brass, 12c.; yellow brass, 9.25c.; lead pipe, 4c.; zinc, 5c.; pewter, No. 1, 28.50c.; tinfoil, 33c.; block tin pipe, 40c.

St. Louis

SEPTEMBER 23.—Prices have moved persistently upward the past week and the demand has been active in all departments. Quotations to-day stand at 5c. for lead and 7.40c. to 7.50c. for spelter, with no evidence of weakness; Lake copper, 17.97½c. to 18.10c., and electrolytic, 17.85c. to 18c.; tin, 50.32½c. to 50.75c., and Cookson's antimony, 9.10c. Conditions in the metal markets are reflected in the ore markets. In the Joplin ore district records were broken both in price and production of zinc blende. The top price reached for the best grades was \$67 per ton with the range of the 60 per cent. between \$60 and \$64.50. In 1905, the previous record year, blende reached \$60, and two months ago it got to \$66.75. Calamine was sold at \$30 to \$31 on the 40 per cent. basis, with choice lots commanding \$36. Lead ore was \$3 stronger than for the previous week, selling at \$65 for 80 per cent. and choice lots bringing \$65.50. On miscellaneous scrap we quote as follows: Light brass, 5.50c.; heavy brass and light copper, 9.50c.; heavy copper and copper wire, 10.50c.; pewter, 21c.; tinfoil, 31c.; zinc, 3.50c.; lead, 3.50c.; tea lead, 3c.

Boston

BOSTON, MASS., September 24, 1912.

Old Material.—The character of the demand shows but little change. A few prices have advanced slightly. The quotations given below are of prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points, taking Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel.....	\$11.75 to \$12.00
Low phosphorus steel.....	13.50 to 14.00
Old steel axles.....	14.50 to 15.00
Old iron axles.....	22.00 to 22.50
Mixed shafting.....	14.00 to 14.50
No. 1 wrought and soft steel.....	11.50 to 11.75
Skeleton (bundled).....	10.00 to 10.50
Wrought iron pipe.....	10.00 to 10.25
Cotton ties (bundled).....	10.25 to 10.75
No. 2 light.....	4.50 to 5.00
Wrought turnings.....	8.00 to 8.50
Cast borings.....	7.50 to 7.75
Machinery, cast.....	12.50 to 13.00
Malleable.....	10.00 to 10.50
Grate bars.....	7.75 to 8.00
Stove plate.....	8.50 to 9.00
Cast-iron car wheels.....	12.50 to 13.00

Iron and Industrial Stocks

NEW YORK, September 25, 1912.

The stock market had apparently been waiting until the season was sufficiently advanced to insure the great bulk of the late crops from serious frost damage. This time seems to have arrived, and prices of all kinds of securities have advanced sharply within the period covered since last week's report. Some of the advances have been so great as to establish new high records. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis Chalm., pref.....	4½	Pressed Steel, pref.....	102½-103½
Bald. Loco., com.....	58½-59½	Railway Spring, com.....	37½-40½
Bald. Loco., pref.....	106-106½	Republic, com.....	28-32
Beth. Steel, com.....	41-44½	Republic, pref.....	89½-92
Beth. Steel, pref.....	73-80	Sloss, com.....	57-59½
Can, com.....	41½-45½	Sloss, pref.....	98
Can, pref.....	120½-126½	Pipe, com.....	19½-21
Car & Fdry., com.....	60-63½	Pipe, pref.....	60½-63½
Car & Fdry., pref.....	118½-119½	U. S. Steel, com.....	74-78
Steel Foundries.....	37½-42	U. S. Steel, pref.....	113½-115½
Colorado Fuel.....	35½-40½	Westinghouse Elec.....	85-85½
General Electric.....	181-183½	Va. I. C. & Coke.....	63-67
Gr. N. Ore Cert.....	46-49	Am. Ship, com.....	59-60
Int. Harv., com.....	124½-125½	Am. Ship, pref.....	100½
Int. Harv., pref.....	120½	Chic. Pne. Tool.....	52½-54½
Int. Pump, com.....	27½-28½	Cambria Steel.....	47½-50
Int. Pump, pref.....	81-81½	Lake Sup. Corp.....	33½-34½
Lackawanna Steel.....	43½	Pa. Steel, pref.....	99
Locomotive, com.....	43½-46½	Warwick.....	10½
Locomotive, pref.....	108½-109½	Crucible Steel, com.....	17-19½
Nat. En. & St., com.....	17½-20½	Crucible Steel, pref.....	96½-99½
Nat. En. & St., pref.....	91½-93	Harb. Wk. Ref., com.....	45½-46
Pittsburgh St., pref.....	101½-102	Harb. Wk. Ref., pref.....	103
Pressed Steel, com.....	37½-40½		

Dividends Declared

The Boston Belting Company, regular quarterly, \$2 per share, payable October 1.

The Otis Elevator Company, regular quarterly, 1 per cent. on the common and 1½ per cent. on the preferred stock, payable October 15.

The Westinghouse Air Brake Company, regular quarterly, 2 per cent. and an extra dividend of 2 per cent. payable October 15.

The Underwood Typewriter Company, regular quarterly, 1 per cent. on the common and 1¼ per cent. on the preferred stock, payable October 1.

The American Iron & Steel Mfg. Company, regular quarterly, 1¼ per cent. on both the common and preferred stocks, payable October 1.

The Union Switch & Signal Company, regular quarterly, 3 per cent. on the common and preferred stocks, payable October 10.

The American Brake Shoe & Foundry Company, regular quarterly, 1¼ per cent., on both the common and preferred stock, payable September 30.

The Safety Car Heating & Lighting Company, regular quarterly, 2 per cent., payable October 1.

The Sloss-Sheffield Steel & Iron Company, regular quarterly, 1¼ per cent. on the preferred stock, payable October 1.

The Crucible Steel Company of America, regular quarterly, 1¼ per cent., payable October 1.

The Westinghouse Electric & Mfg. Company, quarterly, 1 per cent. on the common stock, payable October 30; regular quarterly, 1¼ per cent. on the preferred stock, payable October 15.

The Laconia Car Company, regular quarterly, $1\frac{3}{4}$ per cent. on the preferred stock, payable October 1.

The American Shipbuilding Company, regular quarterly, $1\frac{3}{4}$ per cent. on the preferred stock, payable October 15.

The Union Typewriter Company, regular quarterly, $1\frac{3}{4}$ per cent. on the first preferred and 2 per cent. on the second preferred stock, payable October 1.

The American Screw Company, regular quarterly, $2\frac{1}{2}$ per cent., payable September 30.

The Dominion Steel Corporation, Ltd., regular quarterly, 1 per cent. on the common stock, payable October 1.

The La Belle Iron Works, regular quarterly, $2\frac{1}{2}$ per cent., payable September 30.

Manning, Maxwell & Moore, Inc., regular quarterly, $1\frac{1}{2}$ per cent., payable September 30.

The M. Rumely Company, regular quarterly, $1\frac{3}{4}$ per cent., on the preferred stock, payable October 1.

The Chicago Pneumatic Tool Company, regular quarterly, 1 per cent., payable October 25.

The Western Electric Company, regular quarterly, 2 per cent., payable October 1.

Personal

Benjamin Nicoll, of B. Nicoll & Co., New York, returns from Europe this week on the Olympic.

Thomas Blagden, Jr., who has been in the Boston selling office of the Pennsylvania Steel Company in the past two years, has returned to the New York selling office, 71 Broadway, with which he was formerly connected.

W. S. Pilling, of Pilling & Crane, Philadelphia, Pa., returned September 21 from a two months' trip abroad.

Jonathan R. Jones, vice-president Alan Wood Iron & Steel Company, Philadelphia, Pa., returned September 23 from a vacation of five weeks, spent in the Moosehead Lake region.

W. S. Ransom, of Matthew Addy & Co., Cincinnati, has gone to Bermuda for a vacation.

Alba B. Johnson, president Baldwin Locomotive Works, Philadelphia, Pa., has returned from a three months' motor tour abroad.

A fine full length portrait, in colors, of Sir Robert A. Hadfield, Kt., F.R.S., is presented as a supplement of the issue of September 4 of *Vanity Fair*, London, England. In connection with the supplement, a biographical sketch is given which concludes: "He has made steel and steel has made him."

Charles F. Morgan has resigned the treasurership of the Morgan Spring Company, Worcester, Mass., to enter the Norcross Bros. Company, contracting builder. Evan F. Jones, general manager of the Morgan Spring Company, has added to his duties those of treasurer.

E. A. Overman, secretary and manager of the Western Spring & Axle Company, Cincinnati, Ohio, is recovering from a serious illness.

H. F. Hoewel, president Hoevel Sandblast Machine Company and vice-president Wiener Machinery Company, 50 Church street, New York, has returned from a four months' European business trip, during which he obtained the agencies of several of the most prominent German manufacturers of equipment for foundries and steel works.

Paul W. Webster, who has been connected with the M. H. Treadwell interests for the past six years in various executive capacities, has tendered his resignation to take effect October 1. After that date he will devote all his time to the interests of the recently formed Lutz-Webster Engineering Company, Philadelphia, Pa., of which he is one of the incorporators.

A. E. Jupp has resigned as superintendent of the merchant mills of the Colorado Fuel & Iron Company, Pueblo, Colo. He has been appointed general manager of the Harrow Spring Company's rolling mill at Kalamazoo, Mich.

William H. Wonfor, Cincinnati, Ohio, has been appointed manager of the promotion department of the Egry Register Company, Dayton, Ohio, effective October 1.

W. T. Hugus, formerly assistant manager of the tin mill plant of the American Sheet & Tin Plate Company at

Farrell, Pa., has been made manager of the company's Crescent tin plate works at Cleveland, Ohio, and has been succeeded at Farrell by J. H. Moody.

Obituary

William J. Flather

William J. Flather, one of the founders of the Flather machine tool companies, of Nashua, N. H., died at his home there September 10, of heart failure, following a short illness caused by arterial sclerosis, aged nearly 71 years. He was born in Norwich, England. When he was eight years old the family moved to Bradford, where, after receiving a common school education, he entered the employ of his uncles, William and Henry Hodgson, manufacturers of worsted machinery. His father, being in poor health, was advised to come to America, which he decided to do, sailing for Philadelphia in 1856. The following year William followed with other members of the family, soon after settling on a farm near Rainsboro, Highland County, Ohio. During the next few years he was employed as a machinist at Harpers Ferry, Lowell Machine Shop, Chase & Co., Nashua, and the Grover & Baker Company, Boston. After the Civil War broke out he enlisted in a Pennsylvania company, but on account of his mechanical ability was sent to Frankford Arsenal at Bridesburg, Philadelphia, where he remained throughout the war.

In 1866 Mr. Flather with his brothers moved to Parkersburg, W. Va., and established a shop for the manufacture and repair of oil well tools. As this venture did not prove remunerative, he returned to Nashua and negotiated a partnership for himself and brothers with the late J. K. Priest, who at that time manufactured sewing machines, but later established himself under the title of the American Shearer Company as a manufacturer of clippers of all kinds. It was the intention of Mr. Priest and the Flather brothers to build lathes also, but the lines were so dissimilar that the partnership was soon dissolved, Flather Brothers taking over the manufacture of lathes. Later the name was changed to Flather & Co., consisting of Mr. Flather and his brother Joseph, as active members, and Edward Flather as a silent partner. The high quality of their hollow spindle engine lathes, then something of a novelty, secured them such agents as Hill, Clarke & Co., of Boston, and a certain amount of success.

In September, 1876, their factory was destroyed by fire, being practically a total loss. With the small amount of insurance they received, it was with difficulty that they rebuilt. They had, however, exhibited their lathes at the Centennial Exposition in Philadelphia, which attracted favorable notice from several European manufacturers, resulting in their initial foreign business. After the panic years of the late 70's, their success was firmly established and the business steadily grew in size to its present capacity.

Mr. Flather was also one of the founders of the Mark Flather Planer Company, Flather Foundry Company and E. J. Flather Mfg. Company, withdrawing in 1901 from Flather & Co. and the Mark Flather Planer Company. At the time of his death he was president of the Flather Foundry Company, and was actively identified with the E. J. Flather Mfg. Company. He had marked mechanical ability, sound judgment and a faculty of quietly impressing his convictions on his business and other associates. Although a man of retiring disposition, he had an extensive acquaintance in this country and Europe. He was much interested in public affairs, having served as a member of the city government, Board of Education, State Legislature and Constitutional Convention. He was prominent in financial circles, and was a director of the Indian Head National Bank for 25 years. He was actively interested in religious work, being an officer and trustee in several Methodist Episcopal church societies and institutions, including Tilton Seminary, and was a member of fraternal orders.

While his early education was interrupted by the migrations of his father's family, Mr. Flather was a student all his life, attending evening schools when employed at Philadelphia and devoting much of his leisure time to study and travel, both in this country and Europe. He leaves a widow, a daughter, and two sons, Ernest J. and Harry E. Flather.

Allied Foundrymen's Meetings in Buffalo

(Continued from page 729.)

the men who sell us goods show their honest desire to advance with the times by holding membership in the foremost association of their customers and working with them for improvement, it will pay these customers to scrutinize carefully every solicitor for business and cut those out who have shown themselves either passive or opposed to advancement. It will not pay to do business with them.

MOLDING SAND INVESTIGATION—FOUNDRY COSTS.

The office of the secretary has been extremely busy these last 16 months, as will be seen from the magnificent volume we were able to issue for last year's proceedings. The investigations on the molding sands have also progressed, and a large series of tests were published. A preliminary report is given at this meeting. The subject is so fascinating that much more work will be done, new points being brought out all the time in the course of the experiments. It is hoped that the results will indicate to the sand supply man just how he can treat his product to make it more valuable to the foundryman, and incidentally to himself.

Perhaps one prominent thing that has been brought out by this year's correspondence is the almost total absence of systematic records by individual foundrymen on what they have received for their castings. There seem to be few foundrymen who have tried to classify the castings they have sold, and to average for the year just what these classes of castings have brought them. With our much vaunted American efficiency of system, this is a very weak point, and we are far behind European countries in so systematizing the office cost, beginning where manufacture leaves off, that we may know just what work we can do best and then go after it. Our association does not touch the price question in its deliberations, hence this point is given to the individual members for their personal consideration.

THE PROBLEM OF CONVENTION PAPERS

The change in date for our convention, necessitated by the extreme winter conditions all over the country and consequent delay in the Buffalo preparations, played rather sad havoc with the programme of papers—our good contributors not caring to write papers during the summer season. The result was the receipt of some 20 papers in the week before the convention, with consequent incipient mental paralysis from the secretary to the printers. If, therefore, the quality of the output to be discussed at these conventions may seem to some not up to their expectations, the following should be remembered: The papers are voluntary contributions of busy men in what is becoming a very restricted field for good papers. While we urge promptness in getting contributions to the press, we are beholden to the courtesy of our contributors, and must follow their wishes rather than the other way round. The foundry education required to-day is not taught in schools, but by hard life experience; hence every year sees at these conventions men who have just become acquainted with our friends' silicon and sulphur. Papers must not be written above the quick comprehension of these foundrymen whom it is our work to help along to efficient production for the good of the industry and of the country. If, therefore, papers repeat what is known to most of us, allowance should be made, and if every paper contains simply one point that makes some of us think, the convention has been a success.

THE MALLEABLE FOUNDRY FIELD

A remarkable interest is being taken by the malleable casting and steel casting men in our association at the present time. It argues well for the industries in question, as a frank discussion of methods of manufacture eliminates waste as well as educates the consumer up to what can be done in the foundry and what should not be expected of it. We sincerely hope that these two branches of the iron industry will continue to make our conventions the medium of their technical deliberations right along, and thus increase our publications in value to the membership at large. The steel castings session of last year has attracted widespread attention. Foundrymen in the business as well as those who faced being forced into it found the discussion of utmost value in clearing up disputed

points. The present programme promises further food for thought in this direction.

One very pertinent thing should be mentioned here. In the malleable casting trade, as is known by personal observation of your secretary, there is exactly the same room for a full session's work at these conventions. The lack of knowledge, in view of what has been published, is actually lamentable at times, and the malleable men owe it to themselves to get out of their shell, as the steel casting men have done, and get busy in the public light. The consumer has a right to it.

The government has almost concluded the investigations on the cupola melting problem, at the Pittsburgh plant of the U. S. Bureau of Mines. You will have a preliminary report at one of the sessions, through the courtesy of Dr. Holmes, the director, and our warm friend.

Industrial education is coming to the front more and more in this country, and your able chairman of the Committee on Industrial Education is making a name for this association in educational circles. It is becoming clearer every day that if we are to hold our own—not to speak of progressing—in the rush of the nations toward a future that seems as unknown as it is terrifying, we must have compulsory attendance in continuation schools in our educational system. We should give thought, very earnest thought, to the subject, not as manufacturers, nor as working men—for we are all working men—nor as educators only, but as plain citizens who see a menace before us affecting the future of the country. There are not men enough to do the world's work at the present time, apart from all questions of compensation.

FINANCES

The financial situation of the association is distinctly good. It is the aim of your board of officers to give as much literature to the membership as possible and to economize on the other expenses incident to conducting the association.

Receipts for the fiscal year ending June 30, 1912

Balance	\$366.85
Dues, sales, etc.....	4,795.24
Total	\$5,162.09

Disbursements for same period.

Transactions	\$2,775.48
Printing	84.05
Salaries	1,200.00
Convention expense.....	255.38
Sundries	67.62
Postage	411.00

Total	\$4,793.53
Leaving a balance in the treasury July 1, 1912, of	\$368.56.

The molding sand tests have exhausted the special fund collected several years ago, and the work will go on the account of the association hereafter, as it can be handled.

The relations with our sister societies across the ocean have been most pleasant, and particular mention should be made of the development of the Foundrymen's Association of France. The office of the secretary of our association has been heavily drawn upon during the year for technical information, showing how the shoe has pinched in many establishments owing to the deplorable financial and manufacturing situation just passed. We are always glad to assist in every way possible and urge our members not to hesitate to write when they are in doubt.

The secretary finally has to thank the board and membership at large for the uniform courtesy extended him in his work, and hopes that the same interest may continue.

Cast-Iron at Testing Materials Congress

Dr. Moldenke, who, it will be recalled, was one of the honorary secretaries of the recent congress in New York of the International Association for Testing Materials and interpreter for the German participants in the congress, submitted on his own initiative a very interesting report on the part cast iron played in the congress. It was well received. As covering points not referred to at length in *The Iron Age's* account of the congress, we make the following extracts:

What seemed but a passing remark by one of Germany's famous metallographists, when discussing the failure of metals which had been properly handled and were of good composition, contained, in the estimation of your secretary, the most important point brought out in that great gathering of the world's foremost experts in New York City a few weeks ago. This expert investigator had found that in what seemed unexplainable cases of failure

of steel and other metals and alloys, where the material would seem to come apart by one portion sliding over another when subjected to heavy stress, a close microscopical examination indicated the presence of an infinitesimal layer of oxidized material, slag or other inclusions, which could not be worked out under ordinary hammering or rolling. This was particularly noticeable in cast aluminum and metals liable to oxidation. It was the explanation of many a failure in service, and its solution seemed to lie solely in giving the molten metal time enough at its maximum temperature in the furnace to free itself from all such extraneous materials which had nothing to do with the chemical composition.

The iron founder now knows that he gets cleaner iron from metal which has stood for some time in the ladle before pouring, but he does not know that he can cut his sulphur content very materially by allowing time for the manganese sulphide to rise up slowly out of very hot iron, or that he can get a better mixing of the metal when indications point to a lack of perfect union of the several parts of the charge in running out of the cupola spout.

The further important lesson is that with the growing use of ferroalloys these fine skins of oxidized metals are apt to remain in the molten metal, and to defeat the very object of the additions, so far as strength of the resulting treated metal is concerned. Hence far better to devote every attention to proper mixing and melting than to attempt to correct the product after it has passed from the cupola.

The second difficulty is the subject of pig iron warrants. In storing pig iron it is so much easier to call it No. 1 or No. 2, in place of storing by analysis. The experience in this country would indicate that it is perfectly possible to store iron by analysis on warrants, hence here also it is simply a question of the good English blast furnacemen waking up to the penalty they are paying in the world's markets, when export is the order of the day.

Association's Standard for Coke Analysis

The report of the committee on standard methods for determining the constituents of foundry coke, a re-issue of last year's reports, was on motion of H. M. Lane, seconded by S. B. Chadsey, Massey-Harris Company, Toronto, accepted as the standard of the association. It was explained that no adverse criticisms had been received.

The auditing committee commended the manner in which the association's accounts have been kept. The committee was reappointed.

The Tuesday morning session came to a close with the presentation by Paul Kreuzpointner, Altoona, Pa., of the report of the committee on industrial education.

The Tuesday afternoon session was opened with the presentation in abstract of a comprehensive paper on the open-hearth furnace for producing malleable cast iron by G. A. Blume, Stockholm, Sweden. It included, for example, the account of successful utilization of 3½-ton open-hearth furnaces in Finland. Coal in such localities costs \$5.50 per ton and the open-hearth furnace is an economical proposition as compared with an air furnace with its high fuel ratio. Dr. Moldenke mentioned in passing that a satisfactory gas was there obtained from fuel having only 20 per cent. carbon.

Titanium in Malleable Castings

An interesting series of tests of the use of ferrotitanium with malleable iron was reported in a paper by C. H. Gale, superintendent of foundries, Pressed Steel Car Company, Pittsburgh. It was in a measure a continuation of his paper last year. He used a titanium alloy having 70.18 per cent. iron, 20.66 per cent. titanium, 7.46 per cent. aluminum, 0.84 per cent. carbon and 0.83 per cent. sulphur. The usual open-hearth furnace product was used. From the same heat test bars were made of metal untreated and metal to which 0.25 per cent. alloy was added. The tensile strength of the untreated iron was 48,960 lb. per sq. in. and that of the treated iron was 46,333 lb.; the elongation was 6.1 per cent. in 6 in. in the first case and 5.5 per cent. in the second. In these cases the alloy was put in the 5-ton receiving ladle and then test bars were obtained with the alloy placed in hand ladles. The results obtained were as follows:

	Tensile strength lb. per sq. in.	Elongation per cent. 6 in.
Untreated	53,531	6.2
0.25 per cent. alloy.....	46,973	5.2
0.30 per cent. alloy.....	41,080	5.7
0.35 per cent. alloy.....	45,431	5.7

Mr. Gale referred to the view that the aluminum may

have militated against good results and that films of aluminum oxide may remain in the castings. He mentioned also the necessity of allowing the molten metal to remain at rest so that, for example, the aluminum oxide may rise and reach the slag.

For this reason it is better, as the test results show, to apply the alloy in the large rather than in the small ladles. Another test with 0.15 per cent. of alloy containing 0.03 per cent. titanium and 0.01 aluminum showed 50,580 lb. tensile strength and 5.2 per cent. elongation with the untreated specimen and 49,417 lb. tensile strength and 5.4 per cent. elongation with the alloy. With 0.20 per cent. of the alloy, the tensile strength of the untreated iron was 51,070 lb. and of the treated iron 54,637 lb., and the elongation was 5.5 and 7.1 per cent. respectively. With transverse tests of ½ x 1-in. bars on supports 12 in. apart, the average load for the first series was 1285 lb. for the untreated iron and 1328 lb. for the treated, and for the second series, the load was 1230 lb. for untreated iron and 1385 lb. for treated iron. The limit of the machine was reached in all cases, or 1½ in. deflection.

A telegram of invitation of the members to attend the Co-operative Safety Congress next week in Milwaukee was received from L. R. Palmer, Jones & Laughlin Steel Company, past president of the Association of Iron and Steel Electrical Engineers, which meets simultaneously with the Congress.

Papers on the economies produced by continuous foundry installations, by George K. Hooper, Hooper-Falkenau Engineering Company, New York, on "The Foundry and the Pig Iron Market," by A. I. Findley, editor *The Iron Age*, and on mechanical sand tempering, by V. E. Minich, Sand Mixing Machinery Company, New York City, were presented.

Apprenticeship Schools

A short paper was then presented by C. F. Dudley, North Tonawanda, N. Y., urging that the apprenticeship training should be given under the auspices of the common school. Mr. Kreuzpointner vigorously espoused the cause of the author, regarding his paper as being a practical example of the need of industrial education. He visited a continuation school in Buffalo for backward children. He found they get a continuation of elementary school work, but also woodwork and patternmaking. To show the relation of this work to molding, they have sand and materials to show how the patterns are actually used. Mr. Miles said that in Buffalo about three years ago the convention hall was considered for the purpose, but there was much objection from union labor. He referred also to the failure of the Winona Technical Institute. Major Speer said that a little over 15 per cent. of his molders were once his apprentices. Perhaps 8 per cent. of them were sons of the company's employees. He met with considerable success in teaching the boy all phases of the foundry work. He offered to send to any one interested a copy of the apprentice agreement. The minimum apprenticeship wage is 67½ cents per day.

Air in the Foundry

A paper on compressed air in the foundry was read by Arthur P. Murray, East Cambridge, Mass. He showed by means of lantern slides the use of compressed air hoists in and out of the foundry, air hoists for charging cupolas, the distribution of manholes around a foundry so that a compressed-air fuel-oil supply could be available with short lengths of hose, air apparatus for hauling the core oven car, air-operated core jolt rammers and numerous other applications of compressed air about the foundry. He mentioned a case of one day's being gained in making shipments by the use of sand-blast tumbling barrels against ordinary methods of cleaning castings.

A paper by Willis H. Carrier, Carrier Air Conditioning Company, Buffalo, N. Y., was presented on heating and ventilating the foundry. He showed among a number of lantern slides the Buffalo Forge Company's fan-blast heater which utilizes the direct heat of the fuel without the necessity, for example, of supplying steam, claiming an efficiency of 85 to 90 per cent. against 50 or 60 to 65 per cent., in the ordinary fan system heater. This heater has already been illustrated in these columns, one point being that to avoid the burning out of the tubular heating surface the arrangement is to recirculate about two-thirds of the products of combustion.

The Machinery Markets

Steady improvement in the demand for machinery and generally satisfactory trade conditions continue the country over. From New England comes an intimation that prices of machine tools are likely to advance at an early date, while several centers report that longer time in which to make deliveries is necessary. The New York trade continues active, largely as a result of supplying many small requirements. In Chicago where demand is steady machine tool stocks are greatly depleted, and 10 to 12 weeks is required for filling some orders. There is improvement in practically every line in New England. Philadelphia has been making quiet progress. A steady run of trade has kept Cleveland busy, with some buying by railroads, although Cincinnati finds that a falling off in exports will lessen the month's total in that city. Automobile makers are buying in Detroit where building is unusually active and inquiries promising. Some lines are quiet in the Central South, although there is plenty of business in sight, and power and woodworking machinery continue in good call. Trade continues to do well in St. Louis. The needs in Texas are principally for electrical and irrigation machinery. On the Pacific coast the trade has better sales in prospect following the absorption of a large amount of second-hand equipment which has hampered business in new machines in the last two years. The Isthmian Canal Commission, which is now preparing to equip its permanent shops at Balboa, has an inquiry out on which returns are to be made by October 18 for nine electric traveling cranes.

New York

NEW YORK, September 25, 1912.

The excellent current of business which has been so satisfactory for many weeks maintains its high level in the New York market. The character of the trade, coming as it does from the industries and almost entirely representing replacements and gradual extensions to manufacturing facilities, is of a healthy sort and indicates that manufacturers believe the run of good business is to last long enough to justify additional investment in plant equipment. The western part of the State has contributed a good bit of the trade which has come to the New York market in recent months. Much of this business involved fairly large expenditures while all the time there have been steady purchases of one or small groups of machines and pending inquiries promising a continuance of the same kind of business are numerous. One of the best buyers of recent months has been the Baldwin Locomotive Works, which has been acquiring tools for its Eddystone, Pa., plant. In the last week or two New York houses have felt the buying activity of New England where sales included: The General Electric Company, which bought three screw machines, sheet metal working machinery and a Gisholt turret lathe; the Lombard Governor Company, Ashland, Mass., a few small tools; the Holyoke Machine Company, a 42-in. Gisholt boring mill, a Lucas horizontal boring mill, a No. 3 Lapoint broaching mill, a Pratt & Whitney turret lathe and some Prentice engine lathes for tool room work; the E. P. Jones & Son Company, Pittsfield, Mass., which bought a 68-in. Gisholt boring mill, a punch and shear, cold saw and several woodworking machines needed in the equipment of a new shop. In New York the Staten Island Shipbuilding Company has been a buyer. The Frick Company, Waynesboro, Pa., referred to a week ago as in the market, is expected to place orders at an early date. In some instances manufacturers have been compelled to ask for additional time in which to make deliveries.

The S. H. Burns Company, Brooklyn, manufacturer of jewelry, has completed arrangements with the Belmont Business Men's Association, Belmont, N. Y., to move its plant from Brooklyn to Belmont. Plans are in preparation for a modern fireproof factory building of steel and concrete to be erected at once. The company has been incorporated with a capital stock of \$125,000.

List for Morgan's Louisiana & Texas Lines

Several New York machinery houses have received from the office of N. P. Randolph, purchasing agent of Morgan's Louisiana & Texas Railroad & Steamship Company, New Orleans, La., a request for bids on a diversity of machine tools and railroad shop equipment numbering over 80 items. Quotations are to be made on the machines wanted with and without equipment, in alternate bid and equipment is to be specified with itemized prices of parts. Also required is the time in which shipments can be made and what indemnity will be allowed if shipments are not made at the specified time. In part the list follows, the incidental equipment and many details not being given:

For Texas & New Orleans Railroad Company, Houston, Texas.

- One 90-in. motor-driven right-hand quartering machine.
- One motor-driven radius grinding machine.

- One 30-ton hydraulic rod bushing press.
- One belt-driven No. 3 milling machine.
- One 18 x 48-in. motor-driven engine lathe.
- One 24-in. x 8-ft. motor-driven heavy engine lathe.
- One 16-in. x 8-ft. belt-driven tool-room lathe.
- One 16 x 48-in. belt-driven engine lathe.
- One 2-in. motor-driven turret lathe.
- One 36 x 36 x 12-in. motor-driven planing machine.
- Four 36 x 4-in. No. 5 safety motor-driven wet tool grinding machines.
- One 26-in. shaping machine.
- One 4½-in. x 8-ft. Underwood portable cylinder boring bar.
- One 28-in. Underwood valve facing machine.
- One belt-driven power hack saw.
- One 2A belt-driven pipe threading, cutting and nipple machine.
- One 1500-lb. single frame steam hammer.
- One 5-in. motor-driven Ajax forging machine.
- One 120-ton, 60-ft. 4-in. span electric traveling crane.
- One 15-ton, 58-ft. span electric traveling crane.
- One 15-ton, 61-ft. 4-in. electric traveling crane.
- One steam-driven air compressor, capacity 2500 cu. ft. per minute.
- One 50-ton electric traveling crane, with 10-ton auxiliary hoist.
- One 15-ton electric traveling crane.
- Also four-spindle Angel cock grinding machine, 15-in. Berlin No. 90 planing and matching machine, cylinder knife grinding machine, pedestal side head grinding machine, automatic cut-off saw, power mortising machine, large belt-driven rip saw, annealing and flanging furnace, No. 2 Atlas moss picker, 300-hp. water tube boilers, duplex boiler washing pump, hot water boiler washing and water changing system for changing water in locomotives in 31-stall roundhouse, and electric welding outfits. All electric motors to be designed for: 220-volt, 60-cycle, three-phase, alternating-current circuits.
- For Houston & Texas Central Railroad, Houston, Texas.
- One electric turntable tractor for 80-ft. turntable.
- For Galveston, Harrisburg & San Antonio Railway Company, Glidden, Texas.
- One pneumatic turntable tractor for 80-ft. turntable.
- For Same Road, San Antonio, Texas.
- One air compressor, capacity 1800 cu. ft. per minute.
- One pneumatic flanging clamp, 12 ft. between housings.
- One 4½-in. x 8-ft. portable locomotive cylinder boring bar.
- One No. 3 belt-driven milling machine.
- One 16-in. x 8-ft. belt-driven tool room lathe.
- One 16-in. x 8-ft. motor-driven portable engine lathe.
- One 15-in. belt-driven brass lathe.
- One 26-in. motor-driven crank shaping machine.
- One 36-in. radial drilling machine.
- One 52-in. motor-driven vertical boring mill.
- One Underwriters' Blake-Knowles fire pump.
- Motors on machine tools to be 110-volt, 60-cycle, single-phase.
- For Same Road, Valentine, Texas.
- One pneumatic turntable tractor for 80-ft. turntable.
- For Same Road, Sanderson, Texas.
- One pneumatic turntable tractor for 80-ft. turntable.
- For Same Road, El Paso, Texas.
- One belt-driven 50-ton hydraulic driving box press.
- One 16 X 36-in. belt-driven engine lathe.
- One 16-in. motor-driven turret lathe, 3-in. hole.
- Also, plate bending rolls, 3½-in. Ajax forging and upsetting machine, 300-hp. water tube boiler, 800-hp. feed water heater and oil separator, two jack lift, driving wheel, drop pit, and fire pump. All individual tool motors to be General Electric alternating current, two phase, 220 volt, 60 cycle, 7200 alternations per minute.

For Houston & Texas Central Railroad Company, Ennis, Texas.

- One belt-driven 15-in. slotting machine.
- One 15-in. belt-driven brass lathe.
- One 2-in. belt-driven turret lathe.
- One 36-in. belt-driven radial drilling machine.
- One 36 x 36 x 12-in. belt-driven planing machine.

Also air compressor, 1800-cu. ft. per minute capacity, electric turntable tractor for 80-ft. turntable, and hot water boiler washing system for 15-stall roundhouse.

For Morgan's-Louisiana & Texas Railroad & Steamship Company, Algiers, Texas.

One 50-ton belt-driven hydraulic driving box press, 300-ton belt-driven car wheel press with crane, 48 in. between rails; air compressor, capacity 1800 cu. ft. per minute; 2A belt-driven pipe cutting, threading and nipple machine; Hartz belt-driven flue welder, capacity 2 to 6 in.; motor-driven flange punch, 12-in. stroke, capacity 1½-in. hole in ¾-in. plate; pneumatic flanging clamp, 12 ft. between housings; 1000-gal. per minute fire pump. Individual machine motors to be for 220-volt, 60-cycle, three-phase, alternating-current operation.

The Century Cabinet Company, Fort Plain, N. Y., has plans in preparation for a factory building 60 x 100 ft., three stories and basement, which it will erect this fall.

The city of Niagara Falls, N. Y., is taking preliminary steps for the erection of a municipal electric light plant. Richard Crick, president of the Business Men's Association, has been authorized to secure the services of a hydro-electrical engineer to make plans and estimates.

The Pratt & Letchworth Company, Buffalo, N. Y., has completed plans for a one-story steel furnace building which it will add to its malleable iron and steel casting plant at Tonawanda street and the New York Central Railroad.

The Upson Oil Company, Buffalo, has purchased additional land, 120 x 175 ft., adjoining its distributing depot, Rano street and the Lackawanna Railroad and will build and equip an oil compounding plant.

The Effective Chemical Company, Buffalo, N. Y., has been incorporated with a capital stock of \$25,000 by E. A. and C. D. Kingston and I. A. Wood and will equip a plant and laboratory for the manufacture of drugs, medicines, chemicals, etc.

Witmer & Brown, engineers, Chapin Block, Buffalo, have plans nearly completed for the new waterworks at Brockport, N. Y. Estimated to cost \$275,000. Louis B. Shay, village clerk.

The Titusville Forge Company, Titusville, Pa., will soon award contracts for a machine shop, 85 x 200 ft., one story, of steel and concrete construction. The estimated cost with equipment is \$130,000.

The Erie Car Works, Erie, Pa., has plans in preparation for a new shop building, 100 x 400 ft., one story, of steel and brick construction, which it will build early next Spring. The estimated cost is \$50,000.

New England

Boston, Mass., September 24, 1912.

Manufacturing business continues to improve in practically every line. In the machinery trade the only exceptions to the rule of a strongly increasing demand are some of the builders of the older types of standard machine tools. In fact, conditions are so vitally improved that many houses are producing at maximum capacity, their only remaining resource with existing equipment being the operating of their works overtime. Shops which have increased their capacity in a large way since 1907 are as crowded as they were then. The changes in delivery sheets continue, the instances where shipments are running into the future increasing constantly. While few changes in prices of machine tools are reported, the expectation is that advances will be made at no distant date. The price of labor is increasing, together with that of materials and supplies, and a growing demand will enable builders to correct their lists to meet increasing costs.

The Quinsigamond Pressed Steel Company, Worcester, Mass., has acquired the business and equipment of the John L. Parker Company, and has consolidated the works in the Parker plant. The company does a general business in the manufacture of pressed metal goods. H. F. Larava is the president, W. J. Woods, vice-president, and William A. Dean, treasurer and manager.

The Quigley Foundry & Furnace Company, Springfield, Mass., which is erecting a large plant in the neighboring city of Chicopee, will do a general foundry business, making a specialty of high pressure castings, and will manufacture furnaces for all industrial requirements, such as tempering, annealing and melting. The president of the company is C. K. Lassiter, Richmond,

Va., superintendent of machinery of all the plants of the American Locomotive Company; the treasurer, Mr. Furgerson, was formerly treasurer of the American Locomotive Company; the vice-president, W. S. Quigley, was recently vice-president and general manager of the Rockwell Furnace Company, New York, and the general superintendent, P. R. Ramp, was formerly superintendent of the Murray Iron Works, West Burlington, Iowa. Several prominent men of Springfield and vicinity are interested in the company. A number of furnaces have already been delivered. The company will make a special grade of gray iron which has proved satisfactory in the production of castings requiring a high tensile strength and the ability to withstand a high liquid pressure. Sales offices have been established at 50 Church street, New York.

The Vulcan Iron Works, New Britain, Conn., manufacturer of malleable iron castings, will erect an addition, which, together with the remodeling of an old building, will give a brick structure 80 x 150 ft., one story.

The E. J. Manville Machine Company, Waterbury, Conn., manufacturer of heading machines, thread rolling machinery and presses, will build a machine shop 40 x 200 ft., 30 ft. high. The floor will be served by a traveling crane.

The Waterbury Buckle Company, Waterbury, Conn., will build an additional factory 58 x 123 ft., three stories.

The Boston Electric Show, to be held in Mechanics building, will be open from September 29 to October 26. The management states that the exhibition will exceed all those of previous years in the volume and interest of the displays.

Edwin L. King, secretary of the Pratt & Cady Company, Hartford, Conn., has been made permanent receiver by the superior court following the appointment of a temporary receiver a week ago. It is anticipated that the receivership will be but temporary and will enable the management to better existing conditions and to place the company in a position to fill orders with greater dispatch.

Additions to New England's industrial works include the following: Samuel Ward Company, Boston, Mass., manufacturing stationer, large factory building on Atlantic avenue; Radding Company, Springfield, Mass., builders' materials, 60 x 80 ft., six stories.

The New Britain Machine Company, New Britain, Conn., will increase its capital stock from \$450,000 to \$600,000. The business of the company has increased in an important way, making necessary large additions now under construction. The stock will be issued at \$25, par, to present stockholders.

Philadelphia

PHILADELPHIA, Pa., September 24, 1912.

While the demand for machinery and tools has not shown any decided improvement, the fact that the builders are operating their plants on a better basis is evidence that the volume of business is growing. It will not become sharply noticeable, however, until conditions are reached where buyers find satisfactory deliveries difficult to obtain. Tool builders generally have not reached the point of full operation, and as long as idle capacity is available the trade does not perceptibly feel the effect of increased buying. With activity steadily increasing in industrial lines generally, it is believed that, in the near future, the machinery business will feel this influence. Railroad buying continues light, but indications favor more activity in this line in the near future, when lists now held back will be released. A trifle better demand for power equipment is noted, but mostly for small units. Second-hand machinery and tools have been in fair demand. Little improvement in export business is reported by merchants or manufacturers in this district. Both iron and steel casting plants continue fairly well engaged and report increased inquiry.

J. M. H. Walters has had plans prepared by Peuchert & Wunder for a four-story and basement warehouse and milling building, 50 x 144 ft., to be erected at Thirtieth and Master streets, to replace that destroyed by fire several months ago. The building will be of brick and reinforced concrete and will be equipped with a full line of grain milling machinery, conveying equipment, etc. No power equipment will be required, as that part of the plant was not damaged.

The Philadelphia Storage Battery Company has received bids for the erection of an addition to its plant at Ontario and D streets, 50 x 186 ft., two stories. The

building will be used as an extension to the department used for the manufacture of battery plates. Considerable equipment in the way of machine tools will be required, the purchase of which will not be taken up for several months.

The Schmidt & Sons Brewing Company has begun work on the erection of a large new power house, 54 x 112 ft., four stories, on Girard avenue below Second street. Otto Wolf, Denkla Building, is the architect and engineer.

The Lutz-Webster Engineering Company, Philadelphia, Pa., has recently been incorporated by William H. Lutz and Paul W. Webster as the successor of the Grays Ferry Machine Company. The new company will occupy the present plant at 3103 Grays Ferry road and will continue the general line of special machinery and contract machine work formerly handled. Additional lines which it has planned to manufacture are Lutz compression wrench and accessories, line of steam separators, borometric condensers, vacuum pumps and other specialties.

The Department of Public Safety, City of Philadelphia, Room 215, City Hall, will take bids until September 27 for the boiler equipment for the Bureau of Corrections.

Chicago

CHICAGO, ILL., September 24, 1912.

Manufacturers of machine tools are finding in their lists of tools in stock evidences of the heavy demand that has prevailed in the past few months. Instances are cited with reference to radial drills, lathes and planers, showing only one or two machines in stock and these scattered at various distributing centers. Deliveries not already provided for run into 10 and 12 weeks and even longer. The closing of the several railroad lists in this territory alone, together with the large requirements of the Busch-Sulzer Bros.-Diesel Engine Company at St. Louis, the American Steel & Wire Company at Chicago and other smaller industrial propositions, will accentuate this situation still further. The sales of the past week have been well distributed both as to the character of the machines and the purchaser's locations. Some of the purchases noted called for American radials and lathes, Barnes all geared radial drills, Ohio and Rockford shapers and a number of upright drills. A number of transactions in which second-hand equipment constituted the major portion of the purchases aggregated several thousand dollars in value and was an especially favorable feature of the week's business. The Chicago Board of Education purchased tools to the value of \$5,000.

The Gould Mfg. Company, Chicago, has completed plans providing for the construction of a three-story manufacturing building 98 x 220 ft., to be erected at Ashland avenue and Thirty-eighth street and to cost \$60,000.

Architects Huel & Schmid, 154 West Randolph street, Chicago, have awarded the contract for the erection of a four-story factory building of mill construction for the Spielman Bros. Company, at Hawthorne avenue and Weed street. Estimated cost is \$35,000.

The Boss Mfg. Company, Kewanee, Ill., is planning the erection of a factory at Peoria to cost \$50,000. The structure will be 71 x 100 ft., two stories. Hewitt & Emerson, Peoria, are the architects.

The Cornice & Roofing Company, Decatur, Ill., is enlarging its foundry and adding to its machine shop equipment.

The Emerson-Brantingham Company, Rockford, Ill., is negotiating for a site at Des Moines, Iowa, on which to erect a four-story reinforced concrete warehouse. Equipment will be installed for the handling of heavy machinery.

The Louisville-Vulcan Smelting Company, Waukegan, Ill., has purchased additional property to provide for an enlargement of its plant.

The J. T. Handt Tractor Company, Waterloo, Iowa, has purchased the buildings formerly owned by the Star Foundry Company and will utilize them for the manufacture of tractors. The officers of the new company are John T. Handt, president; C. C. Butler, vice-president, and H. J. Wilson, secretary.

The Collins Company, manufacturer of hardware specialties, will expend \$10,000 on the erection of an addition to its plant at Clinton, Iowa.

The Mews Mfg. Company, manufacturer of hot-water heaters, will erect a new factory at Des Moines, Iowa.

The Freeland Steel Tank Company will erect an addition to its plant at Portage, Wis.

Hugo A. Gutenkunst, Milwaukee, Wis., has been granted a loan of \$60,000 plus a bonus of \$4,000 by the city of Owen Sound, Ont., for the establishment of a malleable iron industry in that city. A four-acre site has been purchased on which a plant costing not less than \$100,000 will be erected.

The United Cold Storage Company, Milwaukee, is planning the erection of a power house and cold storage plant at a cost of \$250,000. John Ahlschlager & Son, 155 North Clark street, Chicago, are the architects.

The George J. Meyer Mfg. Company, Milwaukee, will erect a new foundry and boiler shop at 576 Clinton street. The building will be 130 x 140 ft., two stories, and of reinforced concrete construction.

The Barlow & Seelig Mfg. Company, Ripon, Wis., is building a new factory for its washing machine business. The building will be 64 x 304 ft., of brick and concrete construction.

Detroit

DETROIT, MICH., September 24, 1912.

The demand for machine tools in this market has been remarkably steady in September, and a good volume of business has come out in the past week. Inquiries are promising and conditions favor continued activity. While standard tools have figured considerably in recent sales, still, the demand for special equipment is proportionately greater. Some good business in electrical machinery is noted. The automobile interests are still making purchases and two of the larger companies are understood to be figuring on future requirements. The foundry trade is holding its own and some plants are working to capacity. In spite of the approach of winter, building conditions are unusually active and a large number of contracts are being placed.

There is every indication that the car shortage which caused the manufacturing interests of Detroit so much inconvenience last winter will be repeated. Already contractors are finding it difficult to obtain paving and other materials and coal orders are also being held up. The situation is giving manufacturers considerable uneasiness.

The Herbert Mfg. Company, Detroit, manufacturer of automobile bodies, will erect a new factory building at 1123-35 Vermont avenue. The new plant will cost about \$45,000 and will be 130 x 144 ft., one story, and of brick construction.

It is announced that the Hudson Motor Car Company, Detroit, will erect two new manufacturing buildings instead of one, as previously reported. The additions will provide for a doubling of the floor space in the present plant. Details of construction and equipment are not yet available.

The American Agricultural Chemical Company, Detroit, has taken out a building permit for the erection of an addition to its plant to cost \$12,000.

The Detroit Copper & Brass Company, Detroit, will erect a one-story shop building adjoining its present plant on Clark avenue.

The Detroit Standard Gear Company, Detroit, has been incorporated with \$50,000 capital stock by D. W. Ireland, W. E. Smith and L. E. Shaw.

The East Tawas Flax Company, East Tawas, Mich., will shortly begin work on a new factory which will be equipped for the manufacture of flax products.

The Five Kernels Food Company, Detroit, recently incorporated with \$100,000 capital stock, has acquired a plant at Dundee, Mich., and will equip it for the manufacture of breakfast foods.

Clayton & Son, Lansing, Mich., have acquired the foundry plant of John Dent at Midland, Mich. The new owners will considerably enlarge the plant.

The Kawneer Mfg. Company, Niles, Mich., has completed plans for the erection of a power plant.

The saw and shingle mills of the A. E. Cartier Sons Company, Ludington, Mich., were destroyed by fire September 19, entailing a loss of \$70,000.

The Victor Pump Company, Grand Rapids, Mich., announces an increase in its capital stock from \$12,000

to \$25,000 to provide for its growing business in the manufacture of a self-measuring oil and gasoline pump. The company will be known henceforth as the Victor Pump & Machine Company.

Cincinnati

CINCINNATI, OHIO, September 24, 1912.

While there are a number of orders coming in from all over the country, the month of September will not make as good a showing as August. However, a large percentage of the orders received in August was from the export field, which business is now lightening up somewhat. Electrical equipment continues in excellent demand, and builders of metal-working machinery, such as punches and shears, have no complaint to make, and since the railroads have commenced buying in earnest they anticipate a busy fall season. Second-hand machinery is slow, but there is an improved inquiry from nearby Southern States, a part of which is developing into business.

Secretary Dickson, of the Cincinnati Branch, National Metal Trades Association, has issued the regular report for the quarter ending September 15, showing members' plants in this territory as operating at 88 per cent. The standard of activity is set for the quarter ending June 15, 1907, which was the busiest season the machine tool industry has ever known here. The report issued June 15, 1912, showed 84 per cent., while that of September 15, 1911, was figured at 85 per cent. If fall business is as large as anticipated, the report to be issued December 15 will be near the 100 per cent. mark.

The board of directors of the Cincinnati Commercial Association and Chamber of Commerce have agreed on a consolidation plan, under which the latter will take over the membership of the former and will carry on the work heretofore outlined by both associations. This merger will make the new organization one of the strongest of its kind in the country.

The Queen & Crescent Railroad Company has definitely decided to go ahead with improvements to its Ludlow shops. A large new roundhouse will also be constructed. The additions contemplated will necessitate the purchase of a quantity of machine tools and other equipment sometime later on.

The new shop building of the Cincinnati Traction Company, at Winton place, recently mentioned, will be approximately 50 x 320 ft., one story and of reinforced concrete construction.

Considerable electrical and heating equipment will be required for the proposed county courthouse and jail to be erected in Cincinnati. Plans are already under way and actual construction work will begin within the next few months. The proposed structure is estimated to cost over \$2,500,000.

The Nimmo Fence & Wire Works Company, Cincinnati, Ohio, is buying extra equipment for its large new factory now under construction in Oakley. The company expects to occupy its new plant before November 1 and will commence shortly to move its machinery from its Linwood suburb factory.

The F. H. Lawson Company, Cincinnati, manufacturer of metal specialties, has awarded contract for a one-story warehouse addition to its plant on Whately street that will be 86 x 524 ft.

The Sanitary Mfg. Company, Hamilton, Ohio, will soon be ready for bids on its proposed plant, recently mentioned. It is planned to more than double the output of the present factory.

The John C. Thom Company, Cincinnati, has acquired a large manufacturing site at Summit suburb, on which it plans to erect a planing mill at an early date.

Boilers and other heating equipment will be required for a public school building to be erected at Peebles, Ohio. O. C. Thoroman, Peebles, Ohio, has the plans in charge.

The United States Laundry Supply Mfg. Company, Cincinnati, is erecting a plant in Newport, Ky. L. A. Waters is president of the company.

The Central Tablet Company, Columbus, Ohio, has commissioned V. S. Julian, architect, to draw up plans for a two-story brick factory building that will be approximately 42 x 130 ft.

The Marathon Motor Car Company, Cincinnati, is having plans prepared by Robertson & Fahnestock, architects, for a large garage, connected with which will be a repair shop.

The Gerhart Spring Tire Company, Marietta, Ohio, has been incorporated with \$15,000 capital stock to manufacture an automobile tire. J. A. Gerhart is the principal incorporator.

Fred. H. Berold, Cincinnati, will erect a large garage on Walnut Hills and will require a few small machine tools for a repair shop.

The Columbia Iron Works Company, Cincinnati, has contract for a garage and repair shop to be erected on Montgomery road for the Charles Schiear Motor Car Company.

Indianapolis

INDIANAPOLIS, IND., September 24, 1912.

The Motor Car Mfg. Company, Indianapolis, has increased its capital stock \$75,000, making the total \$1,250,000.

The Pennsylvania Railroad Company has taken out a permit for a new roundhouse at Indianapolis to cost \$78,000.

The Wabash Veneer Company, Indianapolis, has been incorporated with \$30,000 capital stock to manufacture veneers. The directors are: Harry E. Daugherty, Thompson B. Ashby and Fred F. Ashby.

The Chambers Mfg. Company, Shelbyville, Ind., has been reincorporated with \$20,000 increase in the capital stock to a total of \$50,000. The directors are: J. E. Chambers, president; Albert Deprez, vice-president; E. A. Chambers, secretary-treasurer. The company manufactures heat-insulated stoves and cookers.

The Medora Shale Brick Company, Medora, Ind., has increased its capital stock from \$30,000 to \$65,000.

The Modern Utilities Company, Terre Haute, Ind., has been incorporated with \$5,000 capital stock to manufacture household articles. The directors are: D. W. Henry, D. Watson and H. A. Moore.

The Mid-West Specialty Company, Hammond, Ind., has been incorporated with \$15,000 capital stock to manufacture journal packing, etc. The directors are: D. A. Young, J. A. Tweedle and C. R. Tweedle.

The Anstead Spring & Axle Works, Connersville, Ind., is taking bids through W. H. Garn, Mount Block, Connersville, for the erection of a factory addition, 75 x 192 ft., one story.

Cleveland

CLEVELAND, OHIO, September 24, 1912.

Reports from machinery dealers indicate a very good volume of business. While no large orders have been placed recently, there is a steady volume of scattered buying in single tools and small lots, which in the aggregate makes a satisfactory volume of business. No new railroad lists have come out, but there is an improved demand from railroads for one or two tools. Improvement in the scrap trade has resulted in considerable demand for alligator shears. Many machine tool builders now have their plants filled with orders for some time ahead and are unable to make early deliveries. In some cases shipments cannot be promised until after the first of the year. Deliveries are said to be slower on milling machines and vertical boring mills than on other lines of machine tools. The demand for second-hand machinery continues quite active. In electrical equipment no inquiries have come out for large installations in this territory recently, but there is a good steady demand for small motors and generators.

The Standard Chain Company, Pittsburgh, Pa., has closed a deal by which it has secured possession of the Mansfield, Ohio, plant of the Seneca Chain Company, which has been idle for several months. Some improvements will be made to the plant. An electrical welding department will be added as well as machinery for the manufacture of a high grade and heavier chain than has heretofore been made at this plant. It was put in operation September 23. Charles Mehrle, formerly general superintendent of the Seneca Chain Company, has been appointed general manager of the works, which turns out a full line of machine made chain.

The Desmond-Stephan Mfg. Company, Urbana, Ohio, has commenced the erection of a new factory building. The company manufactures injectors, steam specialties and other products.

The Marathon Tire & Rubber Company is a new concern which, it is reported, will build a large rubber tire manufacturing plant in Cuyahoga Falls, Ohio. Property formerly occupied by the Falls Clutch & Machine Company, but not used recently by it, has been taken over by the Marathon Tire Company as a site.

The H. W. Silver Mfg. Company, Salem, Ohio, manufacturer of woodworking machinery and farm implements, has increased its capital stock from \$160,000 to \$500,000.

W. J. Springborn, director of public service, Cleveland, will receive bids October 8 for six 1000-h.p. water tube boilers for the new municipal electric light plant.

The H. C. Tack Company, Cleveland, has increased its capital stock from \$100,000 to \$150,000.

The Youngstown Foundry & Machine Company, Youngstown, Ohio, has let a contract for the erection of a new machine shop. The building will be 60 x 200 ft., of steel construction.

The Superior Tool Company is moving its plant from Wheeling, W. Va., to Cambridge, Ohio, where it will occupy a plant in East Cambridge.

The City Brass Foundry Company, 5323 St. Clair avenue, Cleveland, Ohio, has commenced the erection of an addition to its plant, 50 x 116 ft., two stories, of brick, steel and concrete construction. The new building will be used as a machine shop. Some additional machinery has already been purchased, but other equipment will be required.

The Landman-Griffith Motor Company, Toledo, Ohio, recently incorporated with a capital stock of \$10,000, will erect a building 40 x 100 ft., one story and basement, which will be occupied by a garage, service department and automobile sales rooms.

The South

LOUISVILLE, KY., September 24, 1912.

The machinery trade has been rather quiet in the past week as far as actual sales are concerned. There is plenty of business in prospect, however, and dealers and manufacturers are figuring on a lot of propositions. Owners appear to be stricken by the high cost of living scare, however, for a good many bids are being rejected, resulting in new estimates having to be prepared. Power equipment is in good demand, especially by coal-mining companies, and many new operations are being started in eastern Kentucky. Electric power is being used almost exclusively there. Wood-working machinery is in good call, but most special lines, such as quarrying and drying and refrigerating equipment, are quiet.

The Louisville office of Fairbanks, Morse & Co. reports the sale of two 80-h.p. oil engines to the Phoenix Cotton Oil Company, Memphis, Tenn.; an 80-h.p. engine of the same type to E. A. Appling & Sons, Bartlett, Tenn., and a 60-h.p. oil engine to R. N. Stewart & Son, Tyrone, Ark. All of these are to be installed in cotton gins and are taking the place of steam plants, the substitution of the more cheaply maintained oil unit being a change of distinct moment.

The Peerless Mfg. Company, Louisville, is to install some additional electrical equipment, including a 60-h.p. generator.

The James Clark, Jr., Electric Company, Louisville, has sold a 60-h.p. generator to the Columbia Laundry, Louisville. Most laundries in this section are using electrically operated machines.

The Goldenrod Marble Company, Louisville, has been formed with \$50,000 capital stock to quarry marble. W. R. Tischendorf, of the W. R. Tischendorf Lumber Company, is the principal stockholder.

J. L. Brownfield & Co., Louisville, have been awarded the contract for the installation of a steam heating plant in the buildings of the Little Sisters of the Poor to D. X. Murphy & Bro., architects. A boiler 48 in. x 14 ft., made by the Henry Vogt Machine Company, Louisville, will be installed.

Much interest is being shown in the development of plans by the Howard Shipyards & Dock Company, which was recently incorporated with \$800,000 capital stock for improving and enlarging the scope of the business heretofore carried on at Jeffersonville, Ind., by the Howard Shipyards. The owners of the latter have transferred all of the property to the new corporation to secure an \$800,000 bond issue, the proceeds of which will be used in betterments and extensions. It is reported that the new company will take in a large number of other shipbuilding concerns along the Ohio River. A point of interest is that the steel department will be enlarged and a feature made of steel hull steamboats and barges.

The Burley Tobacco Company, which recently acquired the plant of the Strater Bros. Company in Louisville, is now ready to install new machinery.

The Kentucky State University, Lexington, is considering the installation of a course in automobile construction. A small shop would be equipped in connection with it. F. Paul Anderson is dean of the school of electrical and mechanical engineering.

The city of Lancaster, Ky., which recently authorized a \$12,000 bond issue, has sold the securities and is

ready to go ahead with the construction of a water plant.

J. E. Shoop, Danville, Ky., and D. Phelps, Eubanks, Ky., are planning the installation of an electric light plant at Mt. Vernon, Ky. Mr. Shoop is also arranging to build a similar plant in Williamstown, Ky.

Shelbyville, Ky., business men are preparing to furnish a free site for the erection of a large plant by the Bluegrass Condensed Milk Company. H. G. Carter and R. F. Wortham, Louisville, are officers of the company.

W. J. DeBaun, Perryville, Ky., is considering the installation of an electric light plant in that city. He is at present operating an ice factory there.

The T. H. Callahan Shoe Mfg. Company, Paducah, Ky., has been organized and will equip a factory with an output of 300 pairs a day. The company is headed by T. H. Callahan, who expects to have the factory in operation by December 1.

The Crystal Block Collieries Company, which will operate mines at Peach Orchard, Ky., will install an electric power plant for the operation of its machinery. J. J. Johnson, Ashland, Ky., and others are interested.

The Whitley County Stave Company, Williamsburg, Ky., has been organized and will install a mill for the manufacture of staves, spokes and ties. C. T. Pratt is president of the company.

The waterworks plant of Clarksville, Tenn., is being practically reconstructed and a large amount of new power and pumping machinery is to be installed. S. J. Lowe is superintendent.

The flour mill of the Tennessee Mill Company, Estill Springs, Tenn., was destroyed by fire September 17 with \$300,000. The mill was one of the largest in the South and had a capacity of 2000 barrels a day. The plant will be rebuilt in Chattanooga, Tenn., it is reported. R. J. Riddle is owner and D. F. Riddle is general manager.

The Louisville Brazing Machine Company, Louisville, Ky., has been incorporated with a capital stock of \$5,000 by William Terry, Joseph L. Haag and John C. Krepper. A machine shop will be erected.

The Jackson Ornamental Iron & Bronze Works, Jackson, Tenn., is to install a foundry plant and manufacture its own castings. Most of the equipment needed has been purchased, but the company now requires an overhead traveling crane.

The Knoxville Smelting & Refining Company, recently incorporated at Knoxville, Tenn., with \$25,000 capital stock, is operating an experimental plant and will continue this work. It will install some additional machinery, including a 50-ton unit.

Hunter Raine, Memphis, Tenn., and others are organizing a company with \$250,000 capital stock for the purpose of manufacturing a patented hoist for handling cotton bales and other bulky freight. Another plant may be established in New Jersey to make cotton shipping tags.

St. Louis

ST. LOUIS, Mo., September 23, 1912.

Business in the machine tool market has maintained its satisfactory tendencies in the past week and the totals have been good. The territory generally tributary to St. Louis has offered orders and inquiries in considerable numbers, but as in the recent weeks there have been no really large lists of moment. Second-hand tools are keeping pace with the demand for new tools and are moving readily. Collections are generally satisfactory.

The Alneeda Mills Company, East St. Louis, Ill., C. D. Milleson, president, has let a contract for an addition to its plant and will increase the mechanical equipment for handling grain, etc.

The Clark Mining Company, Springfield, Mo., with \$50,000 capital stock, has been incorporated by S. F. Clark, I. N. Smith, C. A. Mabey and C. C. Sanders, to develop lead and zinc land acquired by them.

The Brauer Bros. Mfg. Company, St. Louis, has increased its capital stock from \$7,000 to \$50,000 for the purpose of increasing its equipment for the manufacture of stove parts.

The Sheffield Creamery Company, Sheffield, Ill., has been organized with \$61,000 capital stock to equip and operate a large creamery with allied industries. The incorporators are John Peterson, J. F. Runft, John P. Jensen, L. C. Houghton, H. J. Bohart and Frank W. Murray.

The W. M. Hundley Mfg. Company, St. Louis, has been incorporated with a capital stock of \$20,000. The incorporators are W. M., M. E. and M. H. Hundley.

The Berry Foundry & Mfg. Company through its president, G. D. Berry, announces that it is

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plant at Sixth and Atchison streets, St. Joseph, Mo., is to be enlarged and \$5,000 expended on a concrete addition, which has become necessary by its increased volume of business.

J. W. Frye and others are installing pumps and other equipment on property owned by them near Carterville, Mo., and will develop a lead and zinc mine there, adding further equipment later.

The Economy Water Heater Company, St. Louis, with \$50,000 capital stock, has been incorporated by John W. Ellebrecht, Leo J. Bayer, F. W. Maury, George E. Booth and A. D. Tibbals to equip a plant for the manufacture of patented water heaters.

The Linzee Hill Mining Company, Carthage, Mo., with \$40,000 capital stock, has been incorporated by Samuel Blair, H. T. During, Lloyd Cowgill and J. H. Millard to equip and develop mining land in the lead and zinc district.

The United Railways Company, St. Louis, has taken out a permit for the construction of a transformer station which will be equipped with machinery for the reduction of the Keokuk, Ia., hydro-electric current to required voltage.

The J. L. Krez Mfg. Company, St. Louis, manufacturer of insulating material, etc., is remodeling new quarters and enlarging its mechanical equipment, preparatory to removal to its new location.

The Locomobile Company, incorporated in Virginia, has leased quarters in St. Louis for a large garage, repair shop and sales room at 3033 Locust street.

The St. Louis Metalware Company, Robert L. Niedringhaus, president, has leased property and will install about \$12,000 worth of machinery at 2507 North Broadway, St. Louis, for the manufacture of oil tanks, metal barrels, etc.

The United Drug Company, Boston, Mass., at a meeting of its stockholders in St. Louis the past week entered upon negotiations for the establishment and equipment of a \$750,000 drug manufacturing plant at St. Louis.

J. A. Swinehart and H. L. Philo, Akron, Ohio, have under negotiation the establishment and equipment in St. Louis of large plant for the manufacture of automobile tires, with facilities for turning out about \$1,000,000 worth of tires annually. Nelson W. McLeod and M. Eisenstadt of St. Louis are among the incorporators.

The Manufacturers Railway of St. Louis has asked bids for the construction of a machine shop, engine house and other buildings to cost \$250,000 exclusive of the necessary mechanical equipment for which lists and specifications will be issued after the contracts for the buildings are let.

The Magnetic Oil & Gas Company, Bridgeport, Ill., with \$10,000 capital stock, has been organized by Melvin P. Stricklin, John Swail and John H. Moore to equip and develop oil property owned by them.

The city of Bevier, Mo., will vote October 8 on a proposition to issue bonds for the purchase of the Bevier Electric Light & Power Company's plant and its enlargement after purchase.

The Gerard B. Lambert Company has acquired a 20,000-acre tract of land near Elaine, Ark., which will be equipped at once with sawmills, etc., for the cutting up of the timber. H. E. Holbrook, G. B. Lambert, J. F. Loughborough, of Elaine, are the incorporators.

J. W. Dension & Co., Helena, Ark., will erect a building 30 x 120 ft., and install machinery for a daily capacity of 35,000 ft. of timber.

Announcement is made that the Scoggin Lumber Company will rebuild its plant and replace the machinery destroyed by fire recently at Mena, Ark.

The W. A. Matthews Company, Pine Bluff, Ark., is erecting a new stave factory at Fort Smith at a cost of \$35,000.

The announcement is made that a packing plant with a capacity of 250 to 300 head of hogs and 150 head of cattle daily and to cost about \$50,000 is to be erected at Pine Bluff, Ark., by William Cargill, formerly of Fort Worth, Tex.

The Southern Paper Company, which is building a plant at Pascagoula, Miss., is putting in digesters, diffusers, etc., in its plant and will utilize about 100 carloads of equipment in completing the mills.

The Oklahoma Pressed Brick Company, Kiowa, Okla., has been organized by J. F. Waymeir, C. W. Crum, T. B. Edwards, H. B. Rowley and J. W. Culbertson and will equip a plant at once at clay beds owned by them.

The Guin Gin Company, Wanette, Okla., with \$50,000 capital stock, incorporated by Robert Morrison,

F. H. Guin and others, will install a cotton gin at once.

The Oklahoma Glazed Cement Pipe Company, Tulsa, Okla., with \$25,000 capital stock, organized by E. A. Carter, G. N. Wright and W. A. Brownlee, will equip a plant shortly.

A bond issue of \$100,000 recently voted by the city of Purcell, Okla., will be utilized in the construction of waterworks and an electric light plant. Bids will be received October 1 by the mayor.

Texas

AUSTIN, TEX., September 21, 1912.

That Texas has entered upon an era of electrical development is shown by the large increase in the demand for machinery and equipment of that character. Not only has there been inaugurated great activity in the construction of interurban electric lines, particularly in the northern part of the state, but much attention is being given to the installation of power plants to provide energy for operating irrigation pumping plants and other machinery upon farms and in small industrial communities in various parts of the commonwealth. There is also an increase in the demand for new equipment for electric lighting plants in the cities and towns. The development of irrigation projects in the more arid sections of Texas continues unabated.

The city engineer is preparing plans and specifications for the proposed subway which is to be constructed under the network of railroads in the Third ward in Fort Worth. It will be about 1000 ft. long.

The San Benito Ice & Cold Storage Company will erect three icing stations on the line of the St. Louis, Brownsville & Mexico Railroad at a cost of \$150,000. One of these stations will be at Bay City, another at Harlingen and the third at San Benito.

W. G. Conroy, of Houston, and associates will install a large fiber factory at Langtry. It is their purpose to utilize the lechuguilla plant as a source of obtaining the raw fiber. This plant, which is a species of cactus, grows profusely all through this part of the state, many millions of acres being covered with it. The proposed factory will not only convert the leaves into fiber, but will manufacture the product into ropes, matting and various other fiber articles.

D. C. Collier, of San Diego, Cal., and associates, who recently purchased a large tract of land near Albuquerque, N. M., will construct a dam for the purpose of creating a large water storage reservoir and will install a hydroelectric plant.

Holt, Alvino & Oglesby will install a new ore reduction mill at the Langston mine near Pinos Altos, N. M., which they recently purchased.

The Salado Townsite Company has been organized at Salado, Texas, to lay out a new townsite and make various improvements, including the installation of public utility plants.

Oscar Pacius and associates will install a plant at San Antonio for the manufacture of wax from the candleilla weed.

The Clarendon Electric Light & Power Company, Clarendon, is constructing a system of power transmission lines to the farming districts of that section. It is also making improvements to its lighting system in Clarendon.

The Austwell Milling & Ginning Company has been organized at Austwell with a capital stock of \$25,000. The incorporators are: B. R. Austin, F. B. Lander and W. L. Dunson.

The Plainview Light & Ice Company has increased its capital stock from \$30,000 to \$60,000 for the purpose of making improvements and extensions to its electric light and power plant at Plainview.

The Sweetwater Ice & Cold Storage Company, which has a capital stock of \$125,000, will install a large ice and cold storage plant at Sweetwater. D. G. Fisher, of Dallas, is largely interested in the project.

The Tyler Electric Street Car Company has adopted plans for the electric power plant that it will install at Tyler. The building will be of reinforced concrete construction.

The Caddo-Clinton Oil & Gas Company has been organized for the purpose of operating in the Caddo oil field near Marshall, Texas. The incorporators are: G. W. Brown, Robert Hope and H. T. Lytleton.

The St. Louis, Brownsville & Mexico Railroad is interested in the erection at Bay City of a large plant for the pre-cooling of vegetables and fruits. The proposed plant will cost about \$80,000. It will be the second one of its kind to be erected by this company in Texas.

The Pacific Coast

SAN FRANCISCO, CAL., September 17, 1912.

Large offerings of second-hand tools have until recently interfered seriously with the sale of new tools in this market. With the closing out of three large plants, the Risdon Iron Works, the Fulton Iron Works and the Abner Doble Company, tools valued at nearly \$500,000 have been thrown on the market within a period of about two years. Offerings of miscellaneous small tools are still uncomfortably large, but the heavier tools and equipment from these plants are now fairly well cleaned up, and machine tool dealers are beginning to look for better times. So far no orders are reported on the recent railroad inquiries, but local shops show a greater disposition to buy than for some time, and sales are gradually improving.

Woodworking machinery is only moderately active. Numerous improvements are planned for sawmills in the redwood and sugar pine districts, but little is being done at this season. A good-sized sash and door outfit has just been installed by the Sunset Lumber Company, Oakland. Contractors on various development projects are still large buyers of general equipment, especially drilling and rock-handling machinery, and there is a good municipal demand for road machinery. Pumps for irrigation are moving unusually well for this time of year.

The Union Iron Works is placing orders for equipment for its new power house. Among other items are three 450-hp., direct-connected, motor-driven compressors, to be built by the Chicago Pneumatic Tool Company.

The Western Pacific Railroad has ordered for the Jeffrey shops a 120-ton Shaw electric crane, to be operated by alternating current motors. This will be the largest crane in use on the Pacific coast.

Stone & Webster have purchased another large compressor and pneumatic tool equipment for drilling, etc., in their power development work.

The American Marble & Mosaic Company, this city, is installing a new gang of marble saws.

While the M. Rumely Company, LaPorte, Ind., will have the Johnson traction engines made on the coast by a local concern for the next five years, it is reported that it has plans under way for the installation of a large shop in this vicinity.

The Rublin quartz mine at Last Chance on the American River has purchased a large Chicago drill outfit and compressor with waterwheel drive.

The Los Angeles Pressed Brick Company is opening a new clay deposit on the Tonopah & Tidewater Railroad in Nevada. A tramway and other equipment are being installed.

The city of Sacramento, Cal., is considering the installation of a street repair plant.

T. B. Walker is shipping machinery for a new sawmill near Susanville, Cal.

It is reported that \$100,000 will be spent on improvements to the Southern Pacific Railroad shops at Tucson, Ariz.

The Pittsburgh Foundry Company, Los Angeles, has been incorporated with a capital stock of \$25,000, by Frank E., H. P. and Walter Burger.

The Los Angeles Public Service Commission is taking figures on an engine, motor and pump outfit, duplicating the set now working on the lower San Fernando dam.

The San Joaquin Light & Power Company is preparing to install a large pumping outfit near Corcoran, Cal.

A new engine is being installed in the Standard Oil pumping station at Richmond, Cal. The Standard Oil Company is starting construction on an asphalt plant at its El Segundo refinery, near Los Angeles.

The letting of contracts for the principal exhibit buildings of the Panama-Pacific Exposition will commence early in November. The first contract let will be for the machinery building.

Canada

WINNIPEG, MAN., September 19, 1912.

The demand for machinery of different kinds, factory tools, heating apparatus, etc., appears to increase steadily as the season advances. The local houses handling these lines are very busy this week. There are indications of great industrial expansion in the West. A large number of Eastern and Southern manufacturers have either bought sites, or are negotiating for sites, on which to establish branch factories in the different distributing centers of Manitoba, Saskatche-

wan and Alberta, and new propositions are looming up every day. Figures have recently been compiled in Ottawa showing the growth of manufacturing in western Canada in the last ten years. In seven of the leading centers, for which figures are available at this writing, the number of manufacturing establishments increased from an aggregate of 180 to 495. The total value of the products of those factories rose from \$17,500,000 in 1900 to about \$69,000,000 in 1911.

The Saskatchewan Terminal Elevators, Ltd., Moose Jaw, has been incorporated, with a capital stock of \$100,000. The company plans to erect terminal elevators at Moose Jaw with a total capacity of 2,000,000 bushels, to be eventually increased to 5,000,000 bushels.

The Canadian Grain Company, Ltd., Saskatoon, Sask., has been incorporated, with a capital stock of \$100,000, and one of its purposes is to erect a number of grain elevators at different points in the province.

The flour mill and grain elevators of the Asquith Mfg. Company, Asquith, Sask., have been purchased by Badger & Sons, of that town. The new owners will install a bleaching system and make some improvements in the machinery there now.

A large new company has been formed at Calgary, Alberta, known as the Alberta Pacific Grain Company, Ltd., with a capital stock of \$3,000,000. The president of the company is Nicholas Bawlf, Calgary, and the general manager, John McFarland. The capital behind the deal is from both Canadian and English sources, and a large number of grain elevators in Alberta have been bought already. It is the intention to build many others, and to establish a large terminal elevator at Fort William. Several well known capitalists are interested.

The Saskatoon Industrial Development & Power Company, Ltd., has been organized at Saskatoon, Sask., with a capital stock of \$1,000,000.

The Saskatoon Industrial League, Saskatoon, Sask., has arranged to give J. Gordon Hill, proprietor of the Saskatoon Lumber Company, in that city, a free site of ten acres, on which, with five acres more that he has bought, he will erect a sawmill with a capacity of 60,000 ft. per day, a box factory and a planing mill.

Hogan & Black, Yorkton, Sask., will establish a sash and door factory and a planing mill.

The Dominion Utilities Mfg. Company, Ltd., Winnipeg, has been incorporated, with a capital stock of \$100,000. The lines to be produced are washing machines and vacuum washers.

The tar-paper factory of the Paterson Mfg. Company, St. Boniface, Man., burned a few days ago, with a loss of \$50,000. The plant will be rebuilt.

The Gramont Traction Plow Company, Springfield, Ohio, is negotiating with the City Council of Moose Jaw, Sask., as to terms on which it will establish a branch factory there. The plant proposed would have an iron foundry in connection with it.

The Saskatchewan Creamery Company is preparing to establish a \$100,000 creamery plant at Moose Jaw.

William Richardson, Portage la Prairie, Man., has purchased the property of the Western Radiators, Ltd., in that city, and will turn it into a general foundry, to be in operation by November 1. Mr. Richardson represents a company now being formed in Winnipeg.

The Union Fibre Company, Winona, Minn., manufacturer of builders' supplies and felting, proposes to establish a factory in Calgary, Alberta. The plans call for a plant to cost in the vicinity of \$250,000.

The Moose Jaw Flour Mills, Ltd., Sask., reported last week to be building a large flour mill at Moose Jaw, will also erect a grain elevator of about 200,000 bushels capacity.

The Monarch Lumber Company, Ltd., Savona, B. C., will erect a new sawmill on the site of the one recently burned.

The town of Port Alberni, B. C., has decided to spend \$115,000 on a waterworks system. The general contractors are Edgell & Dixon, Vancouver.

The Matthews-Lang Packing Company, Ltd., Toronto, is preparing to erect a large cold storage warehouse at Fort William.

The Fabricating Steel Company, Pittsburgh, Pa., has completed arrangements for the establishment of a Canadian branch plant at Welland, Ont.

The Standard Motors Company, Ltd., Toronto, has been incorporated with a capital stock of \$40,000, to manufacture automobiles and will equip a plant for the purpose. George S. Skinner, Harry H. Newman and George P. McHugh are the provisional directors.

The Cook-Fitzgerald Shoe Company, C. J. Fitzgerald, manager, London, Ont., is building an extensive addition to its plant and will install new machinery enabling it to double its present output.

The International Malleable Iron Company, Ltd., Guelph, Ont., has been incorporated with a capital stock of \$250,000 by Charles H. and Richard H. Ivey and Edwin C. Mitchell. The company is completing arrangements for the erection of a plant.

The Collie-Cockerill Company, Toronto, manufacturer of office furniture, will build a four-story factory, 50 x 150 ft. at Aurora, Ont.

Government Purchases

WASHINGTON, D. C., September 23, 1912.

The Paymaster General, Navy Department, Washington, will open bids October 8, under schedule 4832, for the following machine tools to be delivered in Brooklyn: One motor-driven screw cutting back geared extension gap lathe, two motor-driven tool room lathes, one motor-driven column tool room shaper, one 30-in. motor-driven radial drill, one 16-in. motor-driven high speed sensitive drill, one motor-driven universal milling machine, one motor-driven emery grinder, and one motor-driven portable boring machine; schedule 4841, class 91, two duplex combination oil heaters and pumps for delivery to Puget Sound.

The United States Reclamation Service, Los Angeles, Cal., will open bids October 11 for furnishing f.o.b. shipping point pumping apparatus, including four horizontal centrifugal pumps, gates and foot valves, etc.

The Isthmian Canal Commission, Washington, will open bids October 18, under canal circular 730, for structural steel work for 16 permanent shop buildings at Balboa, Isthmus of Panama, for the erection of crane rails and runways and for furnishing crane equipment. There are nine overhead electric traveling cranes specified, three 60-ton, three 25-ton, two 20-ton, one 15-ton and three 2-ton, respectively.

The Bureau of Supplies and Accounts, Washington, opened bids September 17 under schedule 4790, for delivery to Hingham, Mass., as follows:

Class 21, one motor-driven geared head engine lathe—Bidder 37, Fairbanks Company, Washington, \$597; 44, Garvin Machine Company, New York, \$700; 70, Manning, Maxwell & Moore, New York, \$753 and \$808; 90, Prentiss Tool & Supply Company, New York, \$711.50.

Class 22, one motor-driven universal milling machine—Bidder 18, Brown & Sharpe Mfg. Company, Providence, R. I., \$1,337.38 and \$1,211.63, alternate; 37, Fairbanks Company, Washington, \$1,337; 44, Garvin Machine Company, New York, \$1,270; 70, Manning, Maxwell & Moore, New York, \$1,365.

Trade Publications

Sight Feed Oil Pump.—Sterling Machine Company, Norwich, Conn. Bulletin No. 107. Concerned with the model B Sterling sight feed oil pump, which gives a positive feed with every feed or pumping unit. The construction and operation of the pump are described at some length, and there is a line drawing showing the arrangement of the various working parts.

Steam Pumps.—Pulsometer Steam Pump Company, 17 Battery place, New York City. Catalogue No. 18. Size, 6 x 9 in.; pages, 50. Discusses fully the field of operation and the different engineering features of the Pulsometer. Figures and curves showing the steam consumption and the cost of operating one of these pumps under different conditions as compared with the other types of pumps are given. Several novel applications of the pump are discussed, the text being supplemented by a number of illustrations showing how these different applications have worked out in practice, and a number of tables of useful information are included. An illustrated description of the Pulsometer appeared in *The Iron Age*, September 7, 1911.

Disk Grinding.—Charles H. Besly & Co., 118 North Clinton street, Chicago, Ill. Booklet. Size, 6 x 9 in.; pages, 111. Is a treatise on the art of disk grinding with special reference to reducing the cost of flat surfacing in machine construction. This is the second edition of a booklet which was issued about two years ago, that contained 40 pages and 33 illustrations. The present edition is almost three times as large and there are 103 illustrations, and practically every question that may arise with reference to the use of disk grinding machines is answered. There are 17 sections in all, each dealing with some phase of the subject, such as the machine, its applications, the amount of stock to be removed, the distribution of the ground surface, chucking the work, the selection of the abrasive circles, etc. Five sections are given over to various uses of the machine, such as in the tool room, the wood pattern shop, the automobile factory, the gas engine factory and the railroad shop.

Sand Mixing, Universal Grinding and Shaping and Grinding Machines.—William Sellers & Co., Inc., Philadelphia, Pa. Three catalogues. The first, No. 500, pertains to a patent grinding machine for drills, which is made in three different styles for handling drills ranging from 1/8 to 5 in. in diameter. Two of these are power machines, while the third is designed to be used

either as an auxiliary to one of the larger ones or to be mounted on a separate stand. No. 510 describes and illustrates a universal grinding and shaping machine for tools which will finish all types of lathe, planing machine, threading, boring and other miscellaneous tools. A feature of the catalogue is the reproduction of various tools handled by it as well as views of the arrangement of the various parts of the machine for the different operations. Some suggestions on tool dressing are also included. Catalogue No. 1800 illustrates a centrifugal sand mixing machine for foundry sand, core oil and compounds. *The Iron Age*, January 5, 1911, contained an illustrated description of the motor-driven machine, and in addition there is a belt-driven style with the pulley either above or below.

Sand Blast Machines.—Hoewel Sand Blast Machine Company, 50 Church street, New York City. Catalogue HS 1912. Deals with a line of dustless, self-contained automatic sand blast machines. After a brief discussion of the uses of the sand blast, the various types of machine are shown. These are made in different sizes with either sliding or rotary tables. Mention is also made of a sand blast tumbling barrel with the sand conveyor inside the machine and a sand blast machine with a stationary nozzle.

Concrete Mixers.—Blystone Machinery Company, Cambridge Springs, Pa. Pamphlet. Illustrations and descriptive matter explain the operation of an improved type of batch mixer which employs the reverse spiral paddle system. These mixers are mounted on skids for shop use and on a hand truck, both of these machines being driven by a belt connection. A third type is the mounted mixer in which the power is supplied by a gasoline engine driving through gears and a friction clutch.

Pneumatic Tools.—Cleveland Pneumatic Tool Company, Cleveland, Ohio. Catalogue L. Supersedes all previous issues and relates to the Cleveland line of pneumatic tools which include hammers of various types, drilling, flue rolling, tapping, wood boring, grinding and ramming machines. Recent additions to the line include 5 sizes of foundry rammers, 12 sizes of steel casting hammers, concrete bush and buhr stone hammers, drift bolt drivers and jam riveting machines. One of the special features of these machines is the application of annular ball bearings on the crankshaft. All of the tools are illustrated and briefly described with condensed tables of specifications.

Briquetting Machinery.—William Johnson & Sons, Ltd., Armley, Leeds, England, United States Engineering Company, 80 Wall street, New York City, American representative. Brochure B. M. 1. Treats of a line of machinery for briquetting coal, ore, coke, cyanide of potassium, carbide of calcium, etc. Either the ovoid or rectangular type of briquetting machine can be furnished, both of which are illustrated and briefly described.

Automatic Screw Machine Products.—National-Acme Mfg. Company, Cleveland, Ohio. Leaflet and sample of work. Points out the advantages of using an Acme multiple-spindle automatic screw machine for the production of such pieces as nut blanks, etc. The drilling, facing and chamfering operations were done on three blanks simultaneously, and they were cut off in a trifle more time than was required to form any one of them. This was made possible by taking advantage of the eight tool positions which provided for gang and multiple tooling to finish two and three pieces simultaneously, all eight tools being in use at one time.

Lathe Tool Grinding Attachment.—W. W. Blakely, 100 Leicester court, Detroit, Mich. Folder. Shows the Rite-Bi-U lathe tool grinding attachment which is designed for clamping on the lathe. In this way it is possible to keep tools ground ready for use, as one is being pointed up while the other is in use.

Metal Lath.—General Fire Proofing Company, Youngstown, Ohio. Pamphlet entitled "Under Fire." Given the results of a fire test which was conducted at Cleveland, June 28 and 29, 1912, on six different types of partitions. The specifications under which the different partitions were constructed are given and the results of the different tests are mentioned, the text in both cases being supplemented by illustrations.

Air Lift Pumping.—Ingersoll-Rand Company, 11 Broadway, New York City. Form No. 75 superseding No. 74. Size, 6 x 9 in.; pages, 70. Explains very thoroughly the different methods of air lift pumping employed for waterworks, railroad water tanks, irrigation, mine pumping, ice plants, breweries, cold storage and packing houses, textile mills, sewerage installations, drydocks, etc., and gives figures showing the actual cost of operating various installations. The arrangement of the different portions of the system as well as the working of the various arrangements is clearly brought out by numerous halftone engravings.

Molding Machines.—Vulcan Engineering Sales Company, 2014 Fisher Building, Chicago, Ill. Two circulars. V-10 is concerned with the Mumford jolt ramming machine which is made in a number of different sizes and has a capacity ranging from 350 to 9000 lb. V-18 refers to a core bench jolt ramming machine which is designed for settling sand into the deep pockets and among the rods and wires of small cores. An illustrated description of the latter machine appeared in *The Iron Age*, June 1, 1911.

Speed Reduction Gears.—Foote Bros. Gear & Machine Company, 210 North Carpenter street, Chicago, Ill. Catalogue R. Covers the IXL line of speed reducing devices which are made in both spur and worm gear types. The construction of both is described at some length, the text being supplemented by line drawings, and dimension tables and a price list are included. Mention is also made of a semi-universal coupling.

